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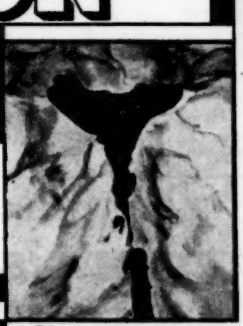

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ITS REPRESENTATION

We speak of the pulse-*wave*, but we think of the pulse not as a wave but as an impact. Our physical conception of a wave is based on three things—its relations in space, its relations in time, and its pressure. In these days of wireless the terms "wave-length" and "wave-frequency" are familiar to everyone. Wave-length refers to the relations of the wave in space, and wave-frequency to its relations in time. Wave pressure determines the size and shape of the wave. The spacial, temporal, and pressure relations of a wave can all be shown simultaneously by the cinematograph; but, of the three, two only can be represented, at one time, in a still picture such as a lantern slide.

We are accustomed to think of the pulse as we feel it on palpation, or as we see it recorded in the sphygmogram (Fig. 19). The sphygmogram is a graphic record of the pressure-time relations of the different elements of the pulse-wave at a particular point in the body, the point usually chosen being the radial artery at the wrist. If one were to record the upward and downward movements of a seagull riding the waves, one would obtain a record of the sea waves comparable to a sphygmogram. But we never think of the waves on the sea in that way. We think of them as they appear in a painting or in a photograph. There they are represented not as a pressure-time relation at a particular point but as a pressure-space relation at a particular instant of time. In the seascape we have eliminated time: in the sphygmogram we have eliminated space.

THE PULSE-WAVE IN SPACE

I want you to think of the pulse-wave as you think of a wave on the seashore. I want you to visualise it as a material wave extending along the brachial artery. Suppose that we could do to the pulse-wave what Vesuvius did to the inhabitants of Pompei, arrest and fix it instantaneously, as it was in life. We should then be able to study, at leisure, the pressure conditions which had pertained throughout the artery at the moment of fixation. Such an experiment is obviously impracticable; we cannot fix the pulse-wave. We cannot ascertain the pressure-space relations of the wave by direct observation; but we can do so by calculation.

We speak of the highest point of a wave as the crest and the lowest as the trough. The part which stretches from the trough of one wave to the crest of the next we call the wave front.

Just as the surface of a curved mirror may be regarded as consisting of an infinite number of plane facets, so the wave front may be considered as being composed of a large number of small elements. Each of these elements has a certain individuality. The behaviour of a particular element may be studied independently of that of its fellows; although the behaviour of the wave front as a whole depends on the combined behaviour of all the elements of which it is composed. The radial sphygmogram tells us the pressure-time relations of different elements on the wave front, at the wrist; and, from direct experiment, we know the rate at which the pulse-wave travels. It is, therefore, a simple matter to calculate the distance which different elements have travelled by the time they reach the wrist. Let me give you an example.

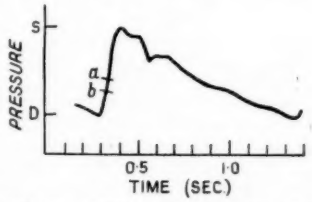


FIG. 19.—Carotid sphygmogram. S = systolic pressure; D = diastolic pressure.

In the sphygmogram shown in Fig. 19, elements in the neighbourhood of the crest of the wave are launched on the blood stream at a pressure near to the systolic pressure, which in this particular patient was 130 mm., those in the vicinity of the trough at a pressure approximating to the diastolic pressure, which was 80 mm. From the experiments on pulse-wave velocity in isolated arteries to which I referred in my first lecture, we know the velocity of the pulse-wave at these pressures. It is 13 and 7·5 metres per second respectively. Hence, if the pressure gradient were smooth, the mean velocity of the wave front as a whole would be 10 m. per sec. and, since 0·1 sec. is the time interval separating the crest from the trough, the length of the wave front would be 10 by 0·1 m.—i.e., 1 metre. In other words, elements on the wave front represented by points at the top and bottom of the upstroke of the sphygmogram are separated from one another by a distance of approximately 1 metre.

In a man of average stature, this is slightly greater than the distance from heart to wrist. That is to say, in the case of the upper limb, when the crest of the pulse-wave is launched upon the blood stream in the aorta, the front of the wave has already reached the wrist. Such a calculation is only approximate; for the pressure gradient on the wave front is not smooth and, as I said in my first lecture, the range of normal variation in pulse-wave velocity is considerable. This calculation, however, does serve to give one some idea of the form of the pulse-wave "in space."

CHANGE IN FORM OF THE PULSE-WAVE DURING TRANSMISSION

Having conceived the idea of the pulse-wave as a material wave extending along the course of a segment of the arterial system, let us now go a step farther and watch it in motion as it travels from heart to periphery. Let us see how the wave front changes in shape in the course of transmission.

The shape of the wave front and the change which it undergoes are determined by various factors. Of these the most important are the output of the heart, the rate at which the blood is ejected from the ventricle, and the diastolic pressure. This is a

* The Lumleian lectures delivered at the Royal College of Physicians on March 9th and 11th, 1937. Lecture I appeared last week.

complicated problem, and, in order to ascertain the effect of these different factors, it is convenient to study wave transmission in an artificial schema of the circulation. This gives us direct control of each of the factors concerned and so enables us to analyse the complex effects produced by their combined action.

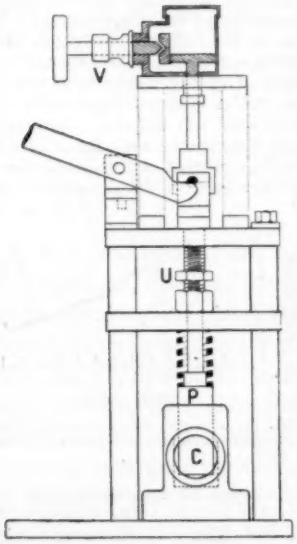


FIG. 20.—Pump as seen from the front in part section. (For description see text.)

In the schema which I propose to describe, the artery was represented by the inner tube of a bicycle tyre, closed at both ends. It contained fluid, but no air. A suitable pump was devised for generating waves in fluid, and sphygmograms were recorded at different points along the course of the tube. By this means it was possible to study the change in form which the pulse-wave underwent as it passed down the tube.

The pump (Fig. 20) consisted of a metal cylinder (C) fitted with a vertical plunger (P). Its output was determined by the length of stroke of the plunger which could be varied by an adjustable nut (U). The rate of ejection depended on the velocity of the stroke of the plunger, which was controlled by an oil valve (V). The initial pressure of the fluid in the tube (which corresponds to the diastolic pressure in the arteries) could be adjusted by altering the height of the reservoir from which it was fed. Thus we were able to vary at will, and independently of one another, the different factors which determine the form of the wave front.

Sphygmograms were recorded either by a lever attached to the upper surface of the tube, and writing on a smoked drum (Figs. 21 and 22) or by a beam of light thrown across the tube through a slit, so that the moving upper surface of the tube cast a shadow on a photographic plate (Fig. 24). Fig. 21 shows the results of a typical experiment. Throughout this experiment, all the conditions were kept constant, and sphygmograms were recorded at different points along the course of the tube. Thus we were able to study the change in form which the wave front undergoes in the course of transmission.

Close to the proximal end of the tube (Fig. 21 A) the record obtained is not unlike a clinical sphygmogram. Its upstroke rises cleanly from the base line. A few centimetres farther down the tube a remarkable thing happens. A small dip (n_1 in C) appears *in front* of the upstroke. As the wave travels down the tube this dip deepens, and at the same time the upstroke becomes steeper. These changes are progressive throughout the first 25 cm. of the tube. Then they are suddenly reversed. The upstroke becomes less steep, the negative wave becomes less deep, and a positive wave (p_1 in E) is shot out in front of the negative wave. As it passes down the tube this daughter wave increases in size. Eventually it becomes as tall as the parent wave. 40 cm. down the tube, a dip (n_2) appears in front of the daughter wave. This grows deeper as the front of the daughter wave becomes more steep, until at 80 cm. the changes are again reversed and another positive wave (p_2) is shot out in front of the daughter wave.

Thus the changes which the daughter wave undergoes in the distal part of the tube are merely a repetition of those which the parent wave underwent in the proximal part. The second positive wave (p_2 in O) might be called the grand-daughter wave, since it bears the same relation to the daughter wave as does the latter to the parent wave.

Let us now return for a moment to the parent. After giving birth to the daughter wave at 30 cm. the wave front once more tends to become steeper and a second daughter wave (*a*, Fig. 21K) is shot out. This fuses with the first daughter wave (*b*). The birth of the daughter and of the grand-daughter waves are events of great importance in the life of their respective parents. For, as I shall show later, they serve to restore their stability, and thereby give them a new lease of life.

Before leaving the artificial schema, there is one other point to which I must refer. If we raise the pressure in the tube by elevating the reservoir, the development of the changes which I have described is retarded. That is to say the parent wave has to travel a greater distance before giving birth to a daughter wave. At high pressures these changes are not merely retarded but abolished. The parent wave then travels the whole length of the tube without changing its form. This is a most important point to which I shall refer later.

The influence of pressure on the form of the pulse-wave is shown in Fig. 22. All these sphygmograms were recorded at the same point on the tube (60 cm. from the proximal end), but the pressure was different in each record. At the highest pressure the record was of simple form, but as the pressure was reduced it became more and more complex. At 30 mm. pressure the daughter wave (p_1) was well developed and at 15 mm. the grand-daughter wave (p_2) was present. This shows that the distance which the pulse-wave has to travel before giving birth to a daughter varies inversely with the pressure. Lowering the pressure produces changes in the sphygmogram at a given point on the tube similar to those observed at successive points along the course of the tube when the pressure is kept constant. Thus, in the development

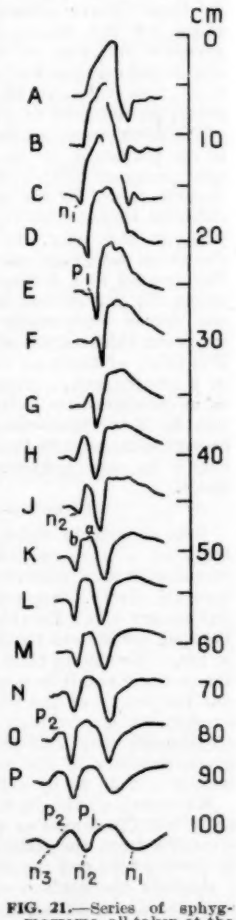


FIG. 21.—Series of sphygmograms, all taken at the same pressure but at different distances, varying from 5 to 100 cm. from proximal end of tyre.

of these pre-anacrotic waves, pressure and distance are interchangeable, and one can plot a curve showing the relation between them. In Fig. 23 at distances and pressures the coördinates of which lie above and to the left of the curve, the sphygmogram is of simple form, while below and to the right of the curve pre-anacrotic waves are present. For example, at a pressure of 30 mm. pre-anacrotic waves will appear before the main wave has travelled 20 cm., whereas at a pressure of 50 mm. they will not appear until it has travelled 70 cm., and at 60 mm. pressure they will never appear at all, the wave retaining its original form until it is eventually damped out.

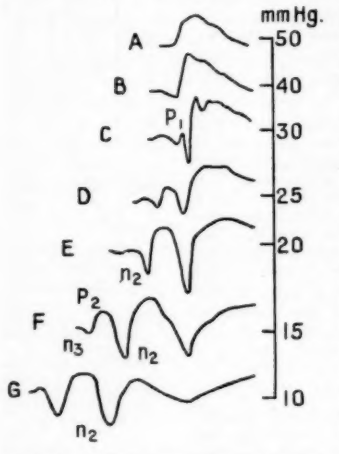


FIG. 22.—Series of sphygmograms similar to Fig. 21, all recorded at 60 cm. from end of tyre, but at different pressures varying from 10 to 50 mm.

INSTABILITY OF THE WAVE FRONT

Let us now leave for a moment the artificial schema and return to the living body. The fact that the upstroke of the sphygmogram may be preceded by small vibrations similar to those which I have just described was first discovered by Erlanger. He found these vibrations in records taken from dogs. He was, however, unable to account for their presence, and the mode of their production remained a mystery.

The first step towards the solution of this problem came from some observations which Hill and I had made (1923) in man. We had shown that, on purely mechanical grounds, under certain conditions, portions of the front of the pulse wave might be expected to become unstable. This would give rise to a turbulent condition in the blood stream with rapid oscillations of pressure in the arteries. We found that, when these hypothetical conditions were satisfied in the living body, anacrotic vibrations did appear in the sphygmogram.

It seemed possible that Erlanger's pre-anacrotic vibrations were produced in a similar way; and, with a view to throwing further light on this problem, I (1925) carried out the experiments which I have described to you, when I was working in Erlanger's laboratory in St. Louis in 1923.

Before describing in detail the mode of development of the pre-anacrotic waves, I must refer once again to waves on the seashore. Most of us, I imagine, still find a certain childish delight in watching waves breaking on the beach. There is a peculiar fascination in following a great wave as it mounts higher and higher and then suddenly, with a roar, dashes itself to pieces. The mechanics of this phenomenon are familiar to all. As the wave approaches the shelving beach, its lower surface is retarded by friction on the underlying sand. The crest of the wave, being free to move in the air, travels more quickly than the trough. The wave front becomes steeper, then concave, and eventually unstable. It loses its balance and crashes over.

What happens to a wave on the seashore happens also to the pulse-wave. The pre-anacrotic waves that I have described are the breakers on the beach.

Let us now consider how these arterial "breakers" develop. As I explained in my first lecture, the velocity at which the pulse-wave travels varies with the tension of the arterial wall, and the tension of the arterial wall is determined by the pressure of the blood within the artery. In our experiments on isolated arteries we showed that, at a diastolic pressure of 50 mm., the pulse-wave velocity is about 5 m. per sec.; whereas, in the same artery, at a diastolic pressure of 100, it is about 10 m. per sec., and, at a diastolic pressure of 150, it is over 15 m. per sec.

These observations all referred to the rate of transmission of elements in the extreme front of the pulse-wave—i.e., close to the trough of the wave. But, as the ventricle discharges its blood, the pressure in the aorta rises; and, by the time that elements near the crest of the pulse-wave are launched upon the blood stream, the pressure in the aorta is approaching the systolic level. Consequently elements near the crest of the wave travel more quickly towards the periphery than those near the trough. Hence the front of the pulse-wave, like that of the wave on the seashore, tends to become steeper as it approaches the periphery. In fact, portions of the wave front may become so steep that their condition is unstable. This entails a redistribution of energy.

Exactly what will happen is difficult to foretell. In the case of a wave on the seashore, when the wave front becomes unstable, it crashes over with the formation of breakers. In a closed system, such as an artery, which contains fluid but no air, the formation of actual material breakers cannot take place. There is nowhere for them to break. It is, however, possible to imagine, in terms of mechanical pressure instead of material water, the occurrence of some phenomenon closely analogous to the formation of breakers. Such a phenomenon would give rise to a turbulent condition in the blood stream, and would manifest itself by rapid oscillations of pressure.

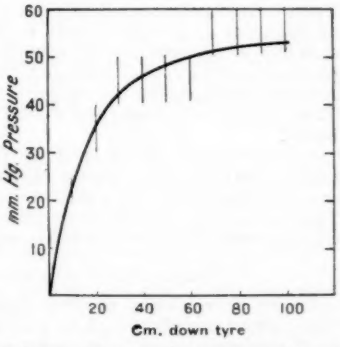


FIG. 23.—Diagram of relation between pressure and distance which determines appearance of pre-anacrotic waves.

Let me give an example. The four sphygmograms shown in Fig. 24 were taken under similar conditions at different points along the course of the tube in our artificial schema. They illustrate the changes that I have described. As the wave travels down the tube, a dip appears in front of the main upstroke, and a daughter wave is given off. For convenience I have outlined these four records in Fig. 25*b*. The shaded areas represent the pre-anacrotic waves. I then calculated the form which the front of the pulse-wave would assume at these different points, if it were able to travel down the tube without losing its stability (Fig. 25*a*).

When the observed sphygmograms are compared with those calculated it is apparent that the pre-anacrotic waves first appear in the neighbourhood of that point in the tube where part of the front of the pulse-wave would be expected to become unstable (Fig. 25 ii). Secondly, the degree of development of the pre-anacrotic waves (as represented by the shaded areas in Fig. 25 *b*), at different points along the tube, corresponds to that which might be anticipated on theoretical grounds. At 5 cm., where a small part of the calculated wave front is almost vertical, there is a small dip below the base line; at 15 cm., where a large part of the upstroke of the calculated sphygmogram has passed beyond the vertical, the pre-anacrotic dip is much deeper; and at 30 cm., where on mechanical grounds one would have anticipated a gross disturbance in the artery, a daughter wave has appeared.

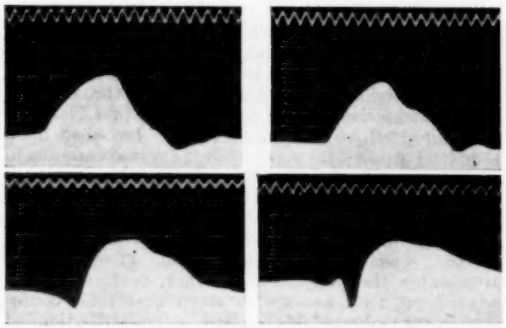


FIG. 24.—Shadow sphygmograms of waves recorded at different points along the course of the tyre (10–40 cm. from the proximal end), in which the initial pressure was 22 mm. Hg. Tuning-fork marking 100 double vibrations per second.

These observations indicate that, when portions of the front of the pulse-wave do become unstable, stability is restored by a redistribution of energy, part of the energy of the main pulse-wave being transferred to a daughter wave, which is shot out in front. These waves are analogous to the breakers on the beach.

On mechanical grounds it is probable that in addition to the pre-anacrotic daughter waves, other daughter waves are shot out in the opposite direction. These would fuse with the main pulse-wave, and would consequently be more difficult to recognise.

"BREAKERS" IN ARTERIES

I may have seemed to have strayed a long way from clinical medicine. I will therefore now turn to "breakers" within the arteries of living man. Breakers will only appear when a large part of the wave front becomes unstable. The likelihood of this occurring depends on two things: (1) the steepness of the wave front in the aorta, and (2) the added steepness which it acquires in the course of transmission to the periphery.

The steepness of the wave front in the aorta depends on the stroke volume of the ventricle and on the rate of ejection of its contents. In a patient with aortic stenosis, for example, the pressure gradient along the front of the pulse-wave is so gradual that there is no possibility of breakers developing. In a patient with free aortic regurgitation, on the other hand, the pressure gradient in the aorta is already so steep that parts of the wave front are bound to become unstable in the course of transmission to the periphery.

In order that the wave front may become unstable in the course of transmission, the elements which are travelling more quickly must catch up on those which are travelling more slowly. It is the same problem which one has to solve in handicapping runners for a race. There the object which we have in view is to enable the faster man to draw level with his opponent as he reaches the tape. The handicap is based on two things, the difference in speed of the runners and the length of the race.

Let us consider the case of a small element *ab* on the front of the pulse-wave (Fig. 19). The race is from heart to periphery. The runners are the two points *a* and *b* at the ends of the element in question; *a* runs faster than *b*. The handicap is the distance separating *a* from *b* on the wave front.

Unless *a* runs much faster than *b* the handicap—i.e., the length of the element *ab*—must not be too big, for the race is short, and *a* will fail to catch *b* before he reaches the periphery.

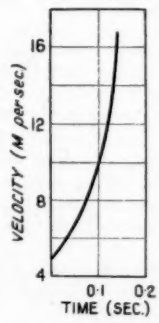


FIG. 26.—Calculated velocity-time curve of upstroke of a hypothetical sphygmogram, all parts of which would become unstable at the same instant.

The relation between speed, handicap, and distance can be expressed very simply as follows:—

If v_1 and v_2 cm. per sec. are the velocities at which *b* and *a* are travelling, the difference in velocity between them is $(v_2 - v_1)$ cm. per sec., and the mean velocity of the whole element *ab* is $\left(\frac{v_2 + v_1}{2}\right)$ cm. per sec. But *a* and *b* are separated by a time interval *t* seconds. Hence the length of the element *ab*—i.e., the handicap—is $t.\left(\frac{v_2 + v_1}{2}\right)$ cm. and the time required for *a* to catch up *b* is

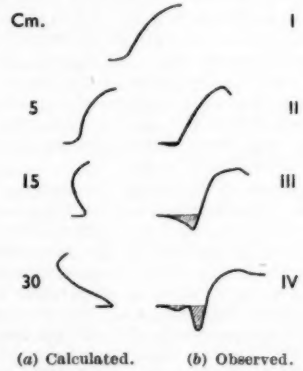
$$\ldots . t.\left(\frac{v_2 + v_1}{2}\right) \Big/ v_2 - v_1 \text{ secs.}$$

—i.e., the handicap divided by the difference in speed of the runners. The distance which the element will travel in this time is

$$t.\left(\frac{v_2 + v_1}{2}\right)^2 \Big/ (v_2 - v_1) \text{ cm.}$$

—i.e., the time *a* takes to catch *b* multiplied by the mean velocity of the element *ab*.

If this distance be less than the distance from heart to periphery, the element *ab* will become vertical, and consequently unstable, in the course of transmission, and breakers will be formed.



(*a*) Calculated. (*b*) Observed.

FIG. 25.—(*a*) Calculated form of sphygmogram at different points along the tube. (*b*) Outline drawings of shadow sphygmograms given in Fig. 24. Shaded areas represent pre-anacrotic waves.

The larger the element which becomes unstable, the greater will be the resulting disturbance in the artery, when the wave front passes from the stable to the unstable condition. When a large part of the wave front suddenly becomes unstable, the vessel walls are subjected to a very severe shock. This may occur in the living body, and is, I believe, an important factor in producing the features characteristic of the water-hammer type of pulse. It is possible to calculate theoretically the form of a wave the front of which would in its entirety become unstable at the same instant. I need not trouble you with the mathematics of this calculation, but plotted graphically the form of the wave front is shown in Fig. 26.

It is striking that, in their initial portions, carotid sphygmograms, obtained from cases of free aortic regurgitation, in which there is a fully developed "water-hammer" pulse, are often very similar in form to the initial portions of the hypothetical curve given in Fig. 21.

THE "WATER-HAMMER" PULSE

I have already referred to the observations of Feil and Gilder (1921) on aortic incompetence. In their paper they call attention especially to two abnormal attributes of the pulse in this condition: (1) the unusually abrupt upstroke, and (2) the occasional presence of rapid oscillations on the upstroke or plateau, constituting a brief thrill. They point out that the "water-hammer" character of the pulse is due to the unusual abruptness of the upstroke; and that the thrill consorts almost, if not entirely, with pulses in which the upstroke is of extremely brief duration.

In patients with aortic incompetence, the steep pressure gradient along the front of the pulse-wave in the aorta, together with the low diastolic pressure in the peripheral arteries, has generally been accepted as a sufficient explanation of the abruptly rising character of the pulse. The explanation of the thrill originally suggested by Corrigan (1832) was that the flaccid vessel walls are set into vibration by the current of blood rushing through the relatively empty arteries. This hypothesis does not appear ever to have been contested.

That the abnormal steepness of the wave front, as it leaves the aorta, will tend to produce a rapidly rising pulse, and that the flaccid arterial walls will very easily be set into vibration is beyond dispute; but the experiments which I have described to you to-day suggest that another factor is partly responsible for these peculiar features—namely, the change in form which the wave front undergoes in the course of transmission. In this condition the wave front is already steep in the aorta, but it becomes still steeper before reaching the periphery.

If the vibrations which constitute the thrill were due simply to a sudden stretching of the arterial walls by the front of the pulse-wave, they would occur after and not during the main upstroke; whereas, if they be produced by the formation of "breakers" in the arteries their mid-anacrotic position is easily explained.

I have already referred to the occurrence of rapid anacrotic vibrations in the human sphygmogram, in conditions other than aortic regurgitation. Physiologically the sphygmogram from a normal healthy individual does not show such vibrations, except after violent exercise; but in disease they are of comparatively common occurrence. Such turbulent motion of the front of the pulse-wave would not be likely to occur under ordinary circumstances. If, however, the diastolic pressure be low, or if the pressure gradient along the wave front be unduly steep, the probability of parts of it becoming unstable before reaching the periphery will be greatly increased.

Wiggers (1923) has called attention to the fact that rapid pressure vibrations occur in the innominate artery of dogs, while they are absent from simultaneous aortic records. He believed that these vibrations were produced by the rebounding of blood in the subdivisions of the aorta. I would suggest that it is much more probable that they are due to certain portions of the wave front, which were stable in the aorta, having become unstable in the course of transmission to the innominate artery.

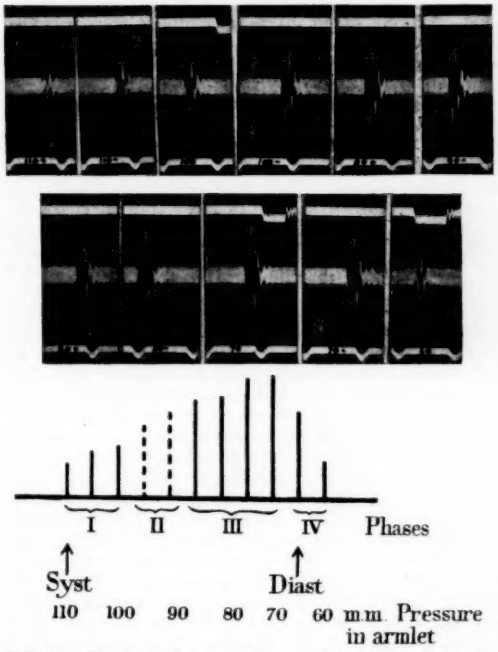


FIG. 27.—The Korotkow sounds recorded graphically during decompression. The diagram shows the amplitude of the sound vibrations in different cycles.

Clinically there is a striking similarity between the pulse of early aortic incompetence and that of exophthalmic goitre, profound anæmia, advanced arteriosclerosis, and certain other conditions. This is especially noticeable in the sensation conveyed to the finger by the carotid pulse. The quickened stroke and forcible beat of the overacting heart in exophthalmic goitre simulate very closely the conditions in normal healthy individuals during and immediately after severe physical exertion. It is not surprising, therefore, that in this disease the carotid sphygmogram occasionally exhibits rapid anacrotic vibrations similar to those that occur in aortic regurgitation.

I will summarise this part of the subject by saying that the "water-hammer" type of pulse is not peculiar to aortic incompetence. It may be present in the other conditions that I have mentioned. The features characteristic of this type of pulse are in part attributable to the increase in steepness which the wave front acquires in the course of transmission and to the development of "breakers" in the arteries.

(To be concluded)

THE TRANSFUSION OF STORED CADAVER BLOOD

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It is well known that the death of an animal by no means involves a simultaneous death of all its tissues and organs. For instance, the muscles removed from the body of a recently killed animal remain contractile for several hours; other examples include the heart, the blood-vessels, and the endocrine glands. Death, therefore, is only the moment of destruction of an intricate complex of connexions and mutual relations between the separate tissues of an organism, which retain their full vitality and function for a varying time. This time depends chiefly on how far the artificial conditions are able to satisfy their fundamental requirements of nutrition and the removal of the products of metabolism. The most elementary of these conditions are shown by tissue cultures, which may grow in vitro for an unlimited time so long as they are periodically washed and transplanted on new nutritive media. But the vitality of such organs as the heart requires for its support a very much more complicated environment which it is difficult to create artificially, and they can exist in vitro for only a comparatively short time. The ideal conditions, of course, would be found only in another living organism where all the processes of nutrition and metabolism are accurately regulated. A good example of this is given by blood transfusion, where the blood of one animal after long preservation in vitro can be successfully transfused into another, and continue to accomplish all its fundamental functions.

From this an extremely interesting question arises: Could not some tissues or organs from the dead body be transferred to the living and continue to function normally? Can a defect in a living body be remedied by the transplantation of tissue from the dead, already doomed soon to perish? The solution of this problem would not only be of the greatest biological interest but might also disclose wide prospects for practical surgery.

PRELIMINARY EXPERIMENTS

As the object of my first researches in this direction I selected the blood, since more is known about the method of its transference, and all the destructive processes that develop after death have a greater influence on it than is the case in any other tissue. Against this there is the weighty objection that an abundant bacterial flora may enter the blood stream even during the last agony, and that, moreover, it must contain a great quantity of toxic substances as the result of death and the autolysis of tissues. But these a priori objections, though logical, need scientific support, and I therefore arranged three series of experiments. I must own that on approaching our researches I thought it hardly probable that the blood from a dead body could be introduced with impunity into the blood system of a living animal. Our notions of death suggested a whole series of acutely toxic substances entering the blood, which must be fatal to any living organism.

The first series of investigations, conducted under my direction by Dr. Kostiukov in 1927, consisted of systematic bacteriological examinations of different tissues and organs taken from animals at varying intervals after their death, and with varying conditions of storing the dead bodies.

In all, 402 examinations were made of tissues and organs taken from the cadavers of 47 animals, killed in different ways and kept at temperatures of 4°–22·5° C. at a time ranging from 15 minutes to 12 days after the death of the animal.

These investigations have shown us that the development of infection in any tissue of the dead body depends upon two factors. The first is the nearness of the given tissues or organs to the chief focus of infection—in healthy animals the gastro-intestinal tract, whence it spreads rapidly by the portal system to the abdominal organs; the farther from the gut the organ the later it is infected. If there are other foci, infection from these will also proceed parallel with that from the intestine. The second factor is the temperature at which the cadaver is kept. In the most favourable conditions for preservation—about freezing point—the tissues nearest to the focus of infection begin to be infected after 10 days. We found this in the peritoneal exudate, the peritoneum itself, and the liver, while the sterility of the tissues further away from the abdominal cavity—brain, muscles, joints, marrow, and heart blood—is preserved for 12 days and more. Even under less favourable conditions these latter remain sterile at 14° C. for 60 hours, while after 24 hours at 22° C. only the bones and marrow are sterile.

Consequently, we can conclude that, contrary to all supposition, the development of infection in certain organs of the dead body takes place rather late—at an appropriate temperature approximately 10 days after death—and therefore surgeons may boldly make use of material from a dead body not only some hours but even some days after death.

The second series of experiments, to determine the toxicity of blood from a dead body, Dr. Kostiukov and I carried out in 1929. Appropriate experiments were made on 15 dogs with which 10 experiments were made, with different modifications.

The technique of the experiments was generally as follows:

A dog was killed after measuring its weight, the blood volume, and the hæmoglobin and number of erythrocytes. Then its cadaver was kept for a certain time at a temperature varying from 5° to 25° C. in different cases. At first the animals were killed with chloroform. It was possible, however, that the amount of chloroform in the blood might influence the results, so we decided to kill the animal by strangling it with the noose of a rope, death taking place almost instantly. After a period of 3–11 hours the body was taken into the operating-room, and under aseptic conditions paraffined glass cannulæ were introduced into the central parts of the carotid and the internal jugular. By rubber tubes connected with the cannulæ it was possible either to draw blood from the vessels of the cadaver or to inject solutions into them. The blood when collected was mixed with a solution of sodium citrate to avoid coagulation.

In the first experiments, when the animal was killed by chloroform and the cadaver was kept in a warm place (22° C.), it was only during the first 4 hours after death that it was possible to get enough blood. After this there was so much clotting that liquid blood could only be obtained with great difficulty after squeezing out each clot. Five hours after death it was impossible to collect blood from the vessels at all. When later we proceeded to killing the animals by strangling, the blood was the typical dark fluid of asphyxia, and thrombosis did not take place in it for over 10 hours, especially when the cadaver was kept in a cool place.

When the blood had been thus obtained a live dog was brought into the operating-room whose blood volume, hæmoglobin content, and red cell count had been determined. After exposing the deep vessels in the neck paraffined cannulæ were introduced into its carotid and the internal jugular. Through the first, blood was drained from the animal and collected in a graduated cylinder; through the second, as soon as necessary, there was injected a salt solution or blood taken from the dead body.

In our first experiments we made very careful and comparatively small transfusions (200–300 c.cm.) from the cadaver into the live dog, which had already been subjected to a moderate bleeding, not exceeding 25 per cent. of its total quantity of blood. The animals seemed so well after transfusion, however, and there was such an entire absence of toxic symptoms, that we soon proceeded to more copious bleedings and to increasing the dose of the transfusion.

Thus we convinced ourselves that even when we substituted blood from the cadavers for as much as 60 per cent. of the total blood volume the animals stood the operation well without showing any sign of poisoning. It must first be mentioned that in these experiments we did not keep the cadaver in a cool place deliberately, but left it at a temperature of 17·5° C., and even 22·5° C.; and secondly, the blood was removed after the maximum time possible for such temperatures—i.e., after 4–5 hours, when clotting had already begun—so that before the transfusion we had to filter off a large number of clots.

From these experiments, therefore, we could conclude that even when keeping the cadaver at the most unfavourable temperatures, and for the longest possible time, the blood possesses no great toxicity and may be transfused with impunity, even in large quantities, into living animals.

VITALITY OF CADAVER BLOOD

It was now possible to attempt to answer the next question, whether the erythrocytes could live and function after their transplantation into a living animal. The observations in the preceding experiments already seem to give an affirmative answer to this question, since in these animals there was neither the jaundice nor the hæmaturia that usually accompanies blood destruction, and their general condition was not that to be expected after the extensive bleeding that had been performed. It might be objected, however, that the blood from a dead body was simply a liquid of complex composition, which after transfusion acted purely mechanically by restoring the volume.

It might also be objected that the erythrocytes of the cadaver blood were already degenerating and were thus unable to perform their functions. To settle the question, and to remove all these objections, we arranged a third series of experiments, involving a much greater loss of blood. There were 20 experiments on 35 dogs, using the same technique as that in the second series. We knew already that dogs usually die when 60–70 per cent. of the total blood volume is withdrawn. An injection of salt solution may temporarily restore the activity of the heart or of respiration, but it cannot ultimately save the animal. Our own experiments confirmed this. After removing 70 per cent. of the animal's blood, and after the immediate injection of a corresponding quantity of warmed saline, not one survived.

Starting from these control figures we tried in our experiments to get the greatest possible exhaustion of blood. Since it usually ceases to flow from the carotid after 70 per cent. has been withdrawn, we had to have recourse to repeated washing out of the animal's blood-vessels with warmed saline, temporarily reviving the animal. By this means we succeeded in raising the degree of blood exhaustion to 90 per cent. This is normally absolutely incompatible with life and no injections of saline or colloidal solutions can avail; only the transfusion of living, functioning blood can keep the animal alive. And yet we also succeeded in maintaining life by transfusing blood from a dead animal. The following is an example:

The dog had a total blood volume of 539 c.cm. with hæmoglobin 95 per cent. and red cells 6,000,000. The first bleeding removed 70 per cent. of the blood, which then ceased to flow from the carotid; the heart and respiration ceased. It was revived by injecting 160 c.cm. of saline. A second bleeding from the carotid produced diluted blood containing only 29 per cent. hæmoglobin. Again 200 c.cm. of saline were injected and after bleeding the fluid contained only 7 per cent. of hæmoglobin. The total quantity of the blood withdrawn reached 90 per cent. This was again followed by stopping the heart and respiration. After transfusion of 450 c.cm. of blood from a dead body, taken 8 hours after death, the animal revived. On the next day the condition of the dog was good, the hæmoglobin being 75 per cent., the red cells 5,700,000. The dog lived in healthy condition for several weeks and then was used for another experiment.

In other experiments a similar effect was obtained by us from the transfusion of cadaver blood taken 10 and even 11 hours after the death of the animal.

These experiments leave no doubt about the fact that the erythrocytes of a dead body 10 and even 11 hours after death still retain their full vitality and are able to function physiologically quite as well as the erythrocytes of normal blood.

These facts were afterwards fully confirmed by the experiments of Barenboim and Skundina in 1931–32. They repeated our experiments, with various modifications, and then studied the vitality of transfused blood in dogs, using as a criterion the capability of the blood for gas exchange, which they established by Barcroft's method. Summing up the results of their experiments upon 47 dogs, they arrive at the conclusion that for 6 and even 10 hours after death blood fully preserves its ability to fix oxygen and retains the properties of blood from the living.

To complete the picture one of my collaborators, Dr. G. G. Karavanov, in 1935 studied another of the elements of blood—the leucocytes—using their power of phagocytosis as a criterion of their vitality. Studying this systematically during the life of the animal, and at different times after its death, he established that phagocytosis is pretty well preserved for the first 11 hours after death, after which it disappears rapidly. These data therefore are also in accordance with the facts mentioned before and confirm our fundamental thesis that the blood in a dead body preserves its vitality for about 10 hours after death, and within this period may be used for transfusion into a live organism. The experimental part of the problem of transfusing cadaver blood may therefore be regarded as decided in principle.

CLINICAL TRIAL

The question now arises about the transference of this data to the transfusion of blood in man. Unfortunately a series of circumstances to do with organisation prevented me from working out this part of the problem myself, and I am indebted to Prof. S. S. Yudin who has continued the work that I began and has introduced into clinical practice the transfusion of blood from cadavers. The abundant material collected by him and his colleagues in

the years 1932–35 already includes statistical data for about 1000 cases, and fully confirms all the fundamental principles that I have established.

It was only last year that it became possible for me to use cadaver blood in my own clinical practice, and our experience in 42 cases allows me to subscribe fully to the enthusiastic support given to this method by Prof. Yudin.[1] I must own that at first I was inclined to ascribe their enthusiasm to the zeal common to all authors of a new method. After my experimental experience I never doubted that transfusion of cadaver blood may give clinical results in no respect worse than those from using the blood of live donors. The assertion, however, that transfusions of cadaver blood sometimes give even better results than those of blood from live donors seemed to me to be wholly improbable.

Nevertheless, my own clinical experience has convinced me that this fact is really true. It was shown by the quantity and quality of the reactions after transfusion. I realise that our series of 42 cases is still too small for making final conclusions, but the general impression is decidedly in favour of the fact that reactions after transfusing cadaver blood are much rarer and are much less conspicuous. For instance, in all our 42 cases a reaction was seen only 6 times in very seriously ill patients, principally with diseases of the hæmopoietic system. In no preceding series in our large experience—over 1000 transfusions using citrated blood as well as the direct method—have we observed so few reactions; in fact, they used to amount to 60 and even 70 per cent. The following case illustrates the contrast between the two methods.

The patient was suffering from carcinoma in the cæcum, with severe anæmia, in consequence of which he received four transfusions. At the first two he had fresh citrated blood from 2 donors of a corresponding group, and in both instances the transfusion was accompanied by an extremely strong reaction, with a severe rigor, headache, collapse, and an eruption on the face. At the third transfusion he had 500 c.cm. of blood from a corpse, also of a corresponding group. This was accompanied only by a rise of temperature up to 101° F. There were no symptoms and his general condition was good. Once again he received fresh citrated blood from a new donor of a corresponding group, and this transfusion was again accompanied by a precisely similar reaction—rigor, rash, and collapse.

We used an absolutely identical method of preparing the apparatus, the salt and citrate solutions in all cases of transfusion, so as to exclude the possibility of any difference in the reactions being due to these. How can this be explained?

In 6 cases the transfusing of cadaver blood was performed without our adding any anticoagulant. The fact, discovered by Skundina, that in some cases there is no coagulation, or rather on the contrary a "disagulation" of cadaver blood, is in itself of great theoretical and practical interest, and will doubtless be a great advantage for the method. Of the 6 cases 5 had no reactions.

The second great advantage of transfused cadaver blood that we have observed is that the increase of hæmoglobin and red cells in the patient is higher than that usually observed after transfusions of an identical quantity of blood from live donors. The following figures show the amount of improvement in a patient with chloranæmia. She had a transfusion of 400 c.cm. of cadaver blood of the corresponding group, which had been preserved for 11 days.

	Before transfusion (May 28th).	After transfusion (May 29th).	After transfusion (June 10th).
Hæmoglobin	33 per cent.	40 per cent.	53 per cent.
Red cells	2,300,000	3,000,000	4,250,000
White cells	5200	5600	6200

These increases after transfusion of cadaver blood can only be explained by its sharp stimulation of the hæmopoietic system. The action seems to be very variable, and in a number of cases we noted a much milder reaction in the blood count, as shown by a very slight leucocytosis, and by the absence of any great deviation in the Arneth count. These differences of reaction probably depend upon differences in the biochemical composition, which in its turn may be dependent upon the cause of death of the cadaver from which the blood was taken. These questions still need further investigation.

It is extremely interesting to learn that Prof. V. P. Filatov, who is working on transplantation of the cornea, has arrived at a similar conclusion—that the transplanted cornea from the cadaver eye generally "takes" better than that from a live donor (see *Lancet*, 1937, **1**, 1395).

ECONOMIC ADVANTAGES

Besides the general value of the method of transfusing cadaver blood has also some advantages from the point of view of organisation. In the first place, the dead body can be exonerated from the suspicion of disease with much greater certainty, since the most elaborate examination of a living donor is limited to clinical, serological, and radiological methods, while the post-mortem examination may include an exhaustive pathological investigation of all the organs. The other advantage is on the grounds of economy. The supply is cheap, and with an efficient organisation it is possible to have always a stock of this blood in any quantity necessary for clinical needs. As an illustration the following instance will suffice.

The cadaver was that of a man of athletic constitution, a wrestler, who had died suddenly of cerebral hæmorrhage. Five hours after his death 2800 c.cm. of blood was taken from him and received into citrate solution. Examination of the blood for syphilis and malaria gave negative results, and bacteriologically it proved sterile. The medico-legal autopsy did not reveal any signs of infectious disease. This blood, after different periods of storing, was transfused into 5 patients—500 c.cm. on the 8th day of preservation to a woman with secondary anæmia; 500 c.cm. on the 8th day to a patient with pulmonary empyema; 450 c.cm. on the 9th day to a patient with a carcinoma of the stomach; 400 c.cm. on the 11th day to another patient with empyema; and 400 c.cm. on the 11th day to a woman with pernicious anæmia. In all these cases the transfusion had the usual favourable effect.

Thus the analysis of my own material leads me to the conclusion that the method of transfusing cadaver blood has a number of very definite advantages.

It is true, however, that these advantages can be made use of in practice only with widespread and efficient organisation for procuring the cadaver blood, and this is only possible in large centres. In practice the normal organisation of transfusing such blood is still meeting a great many difficulties, chiefly from medico-judicial institutions. In spite of the fact that there is a large body of supporting evidence for its value and that full sanction has been obtained for taking blood from cases of sudden death with the observance of certain formalities, the medical men at the courts of justice were unwilling to allow the

[1] A detailed analysis of this work has been published by Prof. Shamov's collaborators, G. G. Karavanov, A. G. Karavanov, and A. E. Pereishtein (*Eksper. med.*, 1936, p. 56). Next week Prof. Yudin will describe the experience gained from his first 1000 cases.

blood of bodies that are at their disposal to be drawn for clinical needs. Yet here, by an active coöperation with those in charge of local mortuaries, there is opportunity for a further practical development of the method of obtaining cadaver blood.

PREJUDICES

There is a strong prejudice in the majority of people at the bare thought of transfusing into a live person the blood from a corpse. One need not, however, go very deeply into these subconscious prejudices to understand that they are of the same order as the primitive instincts that had to be overcome in the early days of ordinary blood transfusion. Thus, when I began to introduce the method of blood transfusion into the Soviet Union in 1919 I often met refusal, even from near relations, to give their blood to save the life of a person dear to them. The wife refused to give blood for her husband, the father for his son, and even a mother would not sacrifice a few cupfuls of her blood to save her child. It was due to a natural fear, inherited from primeval ages, of giving away so valuable a part of their organism as the blood. It needed much work, persuasion, and time to overcome these prejudices, yet they have now been done away with for ever, and there is no longer any serious difficulty in finding donors. Another prejudice often met with during the early stages was the unaccountable animal fear excited in the patients and their relatives by the thought of receiving the blood of another into their own veins. Many only allowed blood from near relatives, women objected to the transfusion of masculine blood, men refused to have feminine blood, and many patients took exception to donors of another race.

Such an attitude towards the transfusion of another's blood is a survival of primitive views about blood as the bearer of particular mystic properties, and therefore a certain period of time elapsed before we could put an end to these prejudices. It is now well known that at present patients fully appreciate the value of a transfusion, often asking for it themselves, generally without taking any interest in identifying the donor.

So also in the transfusion of cadaver blood there are at present prejudices that are essentially analogous. They come first from the friends and relations who feel a "holy awe" at the thought of "disturbing the repose of the dead." If, however, post-mortem examinations are widely used for scientific research, if parts of the human body serve for making up skeletons and different preparations, without offending anyone's imagination, then surely the taking of blood from a small incision in a vein is a very trifling measure—the more so if it is accompanied by the injection of antiseptic solutions and the embalmment of the corpse. If it is true the blood of the dead person, drawn into a glass vessel, retains its full vitality, would this not produce a desire, not to destroy it, but to give it the chance—by transfusing it into the living body—of continuing useful life, even while the body to which it formerly belonged is decomposing? The understanding of these facts ought to afford to the relations of the dead person a sense of deep satisfaction rather than calling forth expressions of horror and protest. There is yet another objection put forth by the patient and his relatives. Cadaver blood in the imagination of a simple and narrow-minded person is involuntarily connected with "ptomaines," corruption, a multitude of microbes, and with the idea that the one to whom this blood has belonged has ceased to exist, and is now exposed to the horrible process of putrefaction. It will be seen therefore that all these notions are thoroughly unscientific, and are associated with the tendency to impart to the blood a whole series of mystic properties connected with the personality of its former host. This conception is also illogical, since in medicine there is now a wide use for blood taken from slaughter-houses, as well as for different organs, prepared in different ways and injected into the veins of a patient. Everyone has become accustomed to this, and nobody protests against it. How much more simple and natural, then, it is to use instead of the blood of a dead animal the blood of a dead human being?

Surely after a certain period man will overcome these prejudices as easily as the numerous others that have arisen during the history of the development of blood transfusion.

CONCLUSIONS

The transfusion of cadaver blood seems to be fundamentally established, experimentally as well as clinically. The method is not only equal to other methods of transfusion, applied in clinics, but may even have some advantages over them.

Further advances may be made along the following lines: first, by a more detailed study of the biochemical changes in the blood after its death; secondly, by accumulating further clinical observations; and thirdly, by an efficient organisation that will make use of the many opportunities to collect blood from all suitable cadavers.

PROLONGATION OF ACTION OF THE PITUITARY ANTIDIURETIC SUBSTANCE, AND OF HISTAMINE, BY METALLIC SALTS

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DURING an investigation of factors influencing gastric secretion, extracts of the posterior lobe of the pituitary gland have been found to have an inhibiting effect on glandular secretion (Dodds and Noble 1937, Cutting, Dodds, Noble, and Williams 1937). As this action is transitory, experiments have been conducted in an attempt to prolong the inhibition. The antidiuretic principle of the posterior lobe, present in the extracts, is readily assayed by the method of Burn (1931) and is thus suited for preliminary tests. Batches of four 200 g. male rats, fasted for 12 hours, were given 5 c.cm. water per 100 g. body-weight and simultaneously injected with the substance on trial. The urine excreted was collected and measured at regular intervals.

Since the action of insulin on the blood-sugar is prolonged by combining it with zinc salts or

* Working with a grant from the Medical Research Council.

protamine (Scott and Fisher 1935, Hagedorn, Jensen, Kraarup, and Wodstrup 1936), it appeared that the action of the antidiuretic principle might be prolonged in the same way. Solutions, therefore, were prepared as follows. A standard weakly acid solution of the active substance was diluted with zinc acetate solutions of various concentrations and neutralised with sodium hydroxide. The volume injected was 0·2 c.cm. per 200 g. body-weight and contained 2γ of the dried active extract.

In Fig. 1 the effect of various concentrations of zinc acetate can be seen. The rapid diuresis following water alone is not affected by control injections of zinc acetate. The antidiuretic action of the pituitary extract alone may be seen in the graph. Similar doses of extract, but with the addition of zinc, give a much more prolonged antidiuretic effect. Dilute

Dose of posterior lobe extract.	Metallic salt and concentration.	Total urine excreted.	Percentage of total urine excretion in—						
			1 hr.	2 hr.	3 hr.	4 hr.	5 hr.	6 hr.	7 hr.
		c.cm.							
0	0	29	22	81	99	..	..	..	..
2γ	0	32	3	37	83	99	..	..	..
2γ	Zinc acetate 0·1 %	35	3	41	77	90	94	..	..
2γ	Zinc acetate 1·0 %	35	0	7	26	50	83	97	..
2γ	Zinc acetate 5·0 %	23	0	2	7	21	45	70	100
2γ	Zinc acetate 10·0 %	20	0	10	13	25	48	62	100
2γ	Mercuric acetate 5 %.	23	52	91	..	..	..	..	..
2γ	Silver lactate 5 %.	32	30	98	..	..	..	..	..
2γ	Palladium chloride 5 %.	35	60	94	..	..	..	..	..
2γ	Gold chloride 5 %.	26	12	92	100	..	..	..	..
2γ	Uranyl acetate 5 %	45	26	57	70	84	90	96	..
2γ	Ferrous sulphate 5 %.	30	8	57	100	..	..	..	..
2γ	Titanous chloride 5 %.	23	7	50	87	99	..	..	..
2γ	Sodium alum 5 %.	28	0	41	80	100	..	..	..
2γ	Thorium chloride 5 %.	33	2	24	60	97	..	..	..
2γ	Ferric chloride 5 %.	28	2	24	64	85	..	..	..
2γ	Lead acetate 5 %.	32	1	18	67	91	..	..	..
2γ	Calcium chloride 5 %.	31	0	16	68	94	..	..	..
2γ	Cobalt acetate 5 %.	32	0	2	36	89	..	..	..
2γ	Copper sulphate 5 %.	23	0	13	54	89	..	..	..
2γ	Chromium trichloride 5 %.	25	4	29	80	92	96	..	..
2γ	Stannous chloride 5 %.	31	5	39	68	78	94	..	..
2γ	Magnesium chloride 5 %.	28	3	18	54	83	99	..	..
2γ	Manganese chloride 5 %.	24	4	8	33	71	96	..	..
2γ	Dialysed iron.	29	2	7	33	60	80	93	..
2γ	Nickel acetate 1 %.	23	3	10	13	27	39	70	100
2γ	Cadmium acetate 1 %.	15	3	7	9	20	38	64	100

concentrations of zinc acetate have a slight effect, but more concentrated solutions markedly prolong the water-excretion curve.

As Scott and Fisher (1935) found that nickel had an effect on insulin similar to that of zinc, and Rosenthal and Kamlet (1937) have shown that aluminium also may act, a large series of metals have been tested to ascertain whether they exhibit a zinc-like action. In all cases a 5 per cent. solution has been employed, prepared in a similar fashion to the zinc extract, except where noted. The results are given in the accompanying Table. In order to compare all the various metals, the hourly urine excretion, expressed as a percentage of the total urine excreted, is recorded. In some cases where the antidiuretic

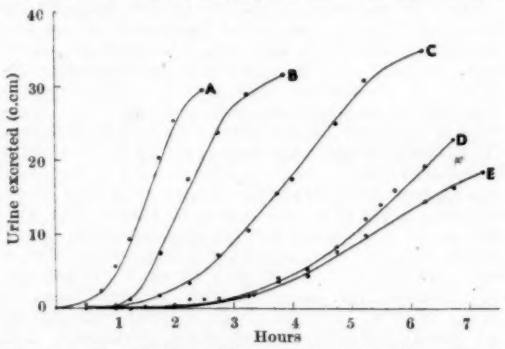

FIG. 1.—Effect of zinc acetate on the antidiuretic action of posterior pituitary extract.

A. Normal diuresis after water—and control zinc acetate injection.
B. Antidiuretic effect of 2γ posterior pituitary extract.
C. ,, ,, 2γ posterior + 1·0 % zinc acetate.
D. ,, ,, 2γ pituitary + 5·0 % ,, ,,
E. ,, ,, 2γ extract + 10·0 % ,, ,,

activity was prolonged, the experiments were terminated after seven hours and the urine excreted in that time considered to be the total secretion.

From these results it is seen that mercury, gold, silver, and palladium appear to have a diuretic activity, and so obscure any action of the pituitary extract. Only a few metals have an action like zinc. Of these dialysed iron, manganese, and possibly magnesium and cobalt exert a slight effect. Nickel and cadmium, however, in the same molecular concentration, have a considerably stronger action than zinc. Control experiments have shown that these metals alone do not affect the kidney in the concentration used.

As it appeared that the addition of zinc salts to other substances might similarly prolong their action, experiments on gastric secretion using histamine as a stimulus were carried out. Gastric fistulæ were established in cats (using Nembutal anæsthesia), the pylorus was tied, and the gastric juice produced by the injection of histamine acid phosphate was collected (Cutting, Dodds, Noble, and Williams 1937). After subcutaneous injection of 3 mg. of this substance, containing 1 mg. of histamine, the gastric secretion normally reached a peak, both in acidity and volume, in 1½–2½ hours, and had returned to normal levels in 4 hours. When, however, the histamine was made up in 0·1 per cent. zinc acetate solution the acidity of the juice was still high 4–5 hours after the injection. With 1 per cent. and 5 per cent. zinc acetate solutions the effect was more pronounced, the secretion not starting for 30 minutes or an hour and high acid values up to 7 hours after injection were obtained. The volume of the juice secreted did not reach a peak during this time but continued to give values lower than normal throughout. The action of the zinc was the same when histamine hydrochloride was used. Fig. 2 shows the total excretion of acid in response to histamine alone and with various zinc acetate solutions. The secretion of acid in each 30-minute specimen is calculated as the product of acid and volume. The repeated injection of such preparations appears to have considerable advantages over surgical

procedures for producing gastric hyperacidity and hypersecretion in animals.

The mechanism by which zinc and other metals prolong the action of various substances is at present unknown. It was originally suggested that zinc and insulin formed some chemical union, with a subsequent alteration in action, but this does not seem likely. Since such unrelated compounds as gonadotropic pituitary hormones (Fevold, Hisaw, and Greep 1936), diphtheria toxin (Rosenthal and Kamlet 1937), insulin, histamine, and posterior pituitary principles all show prolonged action when combined with zinc, a chemical combination common to all these substances seems improbable. A more reasonable explanation would be that zinc alters the absorption from the site of injection. As long as the substance is not destroyed one would expect its action to be less intense, slower in starting, but spread over a longer period. That such is the case is seen in the histamine experiments. The fact that no prolongation of action is observed after the intravenous administration of zinc preparations, and that other metals also have a zinc-like action, supports such a contention. The marked

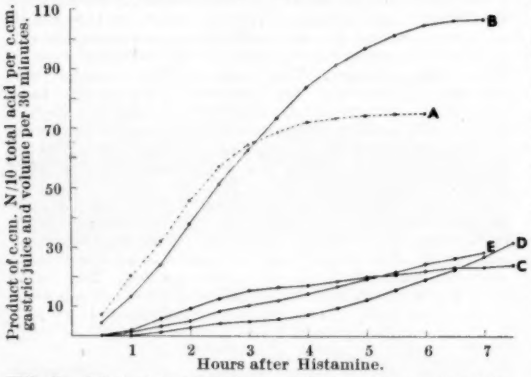

FIG. 2.—Effect of zinc acetate on gastric secretion produced by histamine.

A. Average control response (3 cats) to 3 mg. subcutaneous histamine acid phosphate.
B. Effect of 3 mg. histamine acid phosphate + 0·1% zinc acetate.
C. ,, ,, 3 mg. ,, + 1·0% ,, ,,
D. ,, ,, 3 mg. ,, + 5·0% ,, ,,
E. ,, ,, 1 mg. histamine hydrochloride + 1·0% ,, ,,

difference between the optimal amounts of zinc required for insulin and for histamine is, however, difficult to explain. Some experiments in progress dealing with the influence of zinc on the absorption of dyes also appear favourable to the idea that zinc has a general action on the tissues.

The clinical application of these experiments in the treatment of diabetes insipidus, and the possibility of prolonging the action of substances other than insulin, is being investigated.

SUMMARY

The effect of various metallic salts on the antidiuretic activity of a posterior pituitary extract has been investigated. Zinc salts cause a marked prolongation of activity while cadmium and nickel have a similar and more powerful action.

The action of histamine in stimulating gastric secretion is also prolonged by the presence of zinc.

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VARICELLA GANGRENOSA DUE TO STREPTOCOCCUS PYOGENES

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Varicella gangrenosa was the term used by Jonathan Hutchinson (1882) to describe a condition in which gangrenous patches appeared in the skin during the course of the eruption of chicken-pox. He considered it to be analogous to vaccinia gangrenosa, sporadic in incidence, attacking indifferently robust and delicate children, not infective from case to case in the same family, accompanied by constitutional disturbance, often fatal, complicated at times by iritis and panophthalmitis. He recognised severe types of chicken-pox to include bullous, petechial, or gangrenous forms. The condition was discussed by Crocker (1903) who assigned it to the group "dermatitis gangrenosa infantum," since it was not always secondary to varicella and vaccinia. In a typical form, ulceration was said to occur beneath the scab and extend until a black slough was formed ¼ to 1 in. or more in diameter; but there were many variations, some with hæmorrhage into the vesicles, some with bullous lesions, occasional mild types with superficial gangrene restricted to small areas, more commonly severe and fatal types, some of which were complicated with pyæmic abscesses.

Rolleston (1909) commented on the bacteriology of gangrenous lesions in varicella and mentioned Krjukoff's case (1889) in which virulent diphtheria bacilli were found. Joe (1928) also described a case with associated virulent diphtheria infection in a well-nourished male infant, aged 13 months, who developed several small gangrenous ulcers some twelve days after the onset of chicken-pox and died three weeks later. In this case an intercurrent diphtheritic rhinitis was noted after the onset of the gangrenous condition and provided a possible source of infection with the virulent diphtheria bacilli which were isolated from the lesions at necropsy. Knowles (1911) described a case in which the chicken-pox lesions became filled with blood and later became gangrenous causing death in one week. He considered this to be a case of true hæmorrhagic varicella rather than varicella gangrenosa.

Storrie (1914) was able to collect only 43 cases of varicella gangrenosa, of which 29 had died; he found at that time only 10 or 12 true hæmorrhagic cases on record; mixed hæmorrhagic and gangrenous cases were not unusual; most gangrenous cases described were multiple, few presented a large single lesion. He described two cases with single large gangrenous lesions occurring at an early stage in the eruption, and, although *Staphylococcus aureus* was grown from the lesions, they were associated with one or more of such clinical manifestations of streptococcal infection as scarlet fever, tonsillitis, subacute rheumatism, and arthritis of the elbow-joint. More recent examples of such massive skin gangrene have been described by Nichols (1934) and Watson (1934).

(*Continued from previous column*)

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Nichols's case occurred in a healthy girl, aged 11 years, three days after the onset of the eruption. A purple mottled area 6 in. by 2 in. extended laterally on either side of an infected pock. Incision showed the subcutaneous tissues to be dull grey in colour; there was little bleeding and no pus; death occurred within 36 hours; staphylococcus was found in smears from the lesion.

In Watson's case an indurated and tender area surrounding a small lesion occurred on the fourth day of the eruption. This area became discoloured within four hours, gangrenous in twelve hours, in twenty-four hours extended from axilla to iliac crest, was accompanied by profound toxæmia, and later by broncho-pneumonia and meningism. The bacteriology of the lesion was not worked out. Prompt treatment by blood transfusions (500 c.cm. on each of three occasions) led to slow recovery, a point of great practical importance in view of the desperate nature of the illness.

The case described below is of the same clinical type as Storrie's, Nichols's, and Watson's cases—that is, massive skin gangrene in a single lesion, accompanied by a few smaller lesions, occurring *early* in the eruptive stage of chicken-pox, spreading with great rapidity and with little or no development of pus, accompanied by profound toxæmia, and (in this case) fatal within 48 hours. The special interest of the case is that, although swabs from the lesion showed staphylococcus, the causal organism was proved to be a hæmolytic streptococcus of Griffith Type 23, and that a heavily infected tonsillitis present at the same time was most probably the source of infection.

CLINICAL RECORD

A healthy boy, aged 4½ years, was admitted to the L.C.C. Park Hospital, London, on Sept. 30th, 1936, on the fourth day of the eruptive stage of chicken-pox.

In addition to the typical pocks in all stages of development, there was a large gangrenous area 5 in. by 3 in. surrounded by an indurated livid zone on the right side of the upper trunk, and also several smaller gangrenous spots on the trunk and limbs (Fig. 1). The fauces were injected, the tonsils swollen, the tongue red, stripped, and papillated, clinically suggesting a streptococcal infection; the nostrils were slightly crusted; no membrane was seen in throat or nose. There was also a small area of cellulitis of the skin under the chin. The temperature was 100·6° F., with pulse-rate 154 and respirations 48. The child was in a highly toxic condition, restless, drowsy, and frequently vomiting. The small swelling under the chin was said to have appeared some 24 hours before admission, and the gangrenous areas on the morning of admission.

In view of the possibility of both diphtheritic and streptococcal infection, 16,000 units diphtheria antitoxin was given intramuscularly, and also 20,000 units diphtheria antitoxin and 10 c.cm. streptococcal antitoxin intraperitoneally. Within 24 hours the large gangrenous lesion spread several inches in all directions and along with its surrounding livid indurated zone occupied the greater part of the skin of the right side of chest and abdomen. The smaller scattered gangrenous areas, seven in number, varied in diameter from ½ to 1½ in. and changed little throughout the course of the illness. The area of cellulitis under the chin increased slightly. The child was in extremis, all feeds were vomited, salines were not retained. He was given 400 c.cm. Ringer's solution with 5 per cent. glucose intraperitoneally. He gradually sank and died on the evening of Oct. 1st—that is, within 48 hours of the appearance of gangrene.

During life, swabs taken from the nose and throat showed streptococci, staphylococci, diphtheroid bacilli, pneumococci, and Pfeiffer's bacillus in films, and staphylococci and hæmolytic streptococci on culture. No diphtheria bacilli were found; Hofmann's bacillus was present. Swabs from the large gangrenous area showed staphylococci in films and *Staphylococcus aureus* on culture; no diphtheria bacilli were found; Hofmann's bacillus was present; no streptococci were grown from swabs of the gangrenous area.

REPORT OF NECROPSY

MACROSCOPIC

The skin showed several dark necrotic lesions of the skin (Figs. 2 and 3). Two of these lesions were on the anterior aspect of the abdomen; two on the left side of the chest; one over the left great trochanter; one over the anterior aspect of the upper third of the right thigh; one on the left upper arm in the region of the insertion of the deltoid; one on the left side of the chin, 1 in. below the angle of the mouth. There was a large area underneath the right axilla in which the skin had desquamated, but there was no definite central eschar to be seen.

The above lesions consisted of a central black dry eschar surrounded by some degree of congestion. The surrounding and underlying tissues were deeply infiltrated, and were hard to the touch. There was no gas formation, neither was there any offensive smell as would occur with anaerobic organisms. In addition to these lesions there were a few typical varicella pock-like lesions to be seen. On excising through the skin of one of these necrotic areas the whole underlying tissue was found to be thickened, hard, and definitely necrotic. The wound filled with clear exudation immediately. In some instances the lesions only went through the depth of skin and subcutaneous fat. In the lesion under the right axilla the intercostal muscles were also affected. The characteristic feature was necrosis. There was no pus and surprisingly little congestion—this would be accounted for by the intense œdema and tension under which the tissues were placed.

The peritoneal cavity contained about one pint of clear yellow fluid. There was clear fluid in each pleural cavity.

The *tongue* was furred and congested in the posterior half. The *tonsils* were congested. There was no evidence of membrane over them. The peritonsillar area was very congested. The *trachea* was congested, and the *bronchi* more so, particularly in the lower portion. The *lungs* were voluminous, dark in colour, and were not adherent to the chest wall. There was no consolidation to be felt.

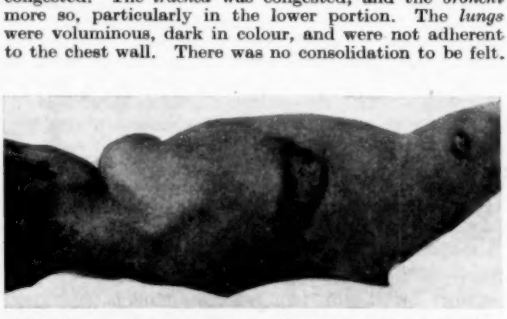

FIG. 1.—Varicella gangrenosa. Large and small necrotic lesions during life.

On section there was slight œdema and much congestion. There were no hæmorrhages underneath the pleura.

Heart.—The pericardial sac contained ½ oz. of clear fluid. The heart showed marked dilatation of the right side. There were no subpericardial hæmorrhages. On opening the heart there was found to be clot in the right auricle and ventricles, probably of antemortem origin. The left side was in systole. The valves were normal. The heart muscle was pale and flabby.

The *stomach* and *intestines* appeared normal. The *liver* was slightly enlarged and was light in colour. On section there was marked cloudy swelling and commencing fatty change. Here and there a few small areas of localised congestion were found. The *gall-bladder* was distended and contained a clear mucous fluid. The *spleen* was somewhat enlarged but quite firm. On the outer aspect there was an area of perisplenitis, and a small area about the size of a sixpence covered with fibrin. Underneath this area was some congestion and hæmorrhage. On section the spleen was firm and dark in colour. The Malpighian

bodies could be distinguished. There was no infarct. Both *kidneys* showed some congestion. The cortex was pale and showed some cloudy swelling. A few small areas of local congestion were observed. The capsule stripped easily. The *suprarenals* appeared normal and were not congested.

Underneath the *lesion of the chin* there was a firm brawny swelling which on excising consisted of œdematous necrotic tissue, but no pus was seen.

The central nervous system was not examined.

MICROSCOPIC

Skin lesion.—Sections were made from three sites, all of which show the same general features—disappearance of epithelium, necrosis of the surface layers, congestion, hæmorrhage, and œdema of the deeper tissues extending into the muscular layers. There is very little cellular reaction. At the edge of the surface lesion the necrotic process can be seen below the intact epithelium penetrating the deeper tissues to a considerable distance beyond the site of the clinical condition. There is no suggestion of pus formation, or marked infiltration with leucocytes. By Gram's method large numbers of streptococci can be seen in the superficial necrotic layer, and in the deeper tissues and extending outwards in the fatty-areolar tissue in lines parallel with the surface.

Tonsil.—Section shows very marked congestion. There is some desquamation of the epithelium, and in the crypts

FIG. 2.—Large lesion post mortem.

there is necrotic material which contains large numbers of streptococci. The surrounding tissue is also markedly congested.

The *lung* shows no consolidation but much congestion and some areas of œdema. The bronchial epithelium is disorganised. Some masses of streptococci—probably post mortem in origin—are to be seen. The *heart* also shows congestion and acute toxic myocarditis. In the *liver* there is congestion, marked cloudy swelling, and fatty change; the fibrous tissue of Glisson's capsule shows infiltration with mononuclear cells. Section of the *spleen* shows some congestion, and in parts small hæmorrhages. There is a reduction in the lymphatic tissue of the Malpighian corpuscles. The cells of the pulp show proliferation and degenerative changes. By Gram's method a few streptococci were seen in the pulp. In the *kidneys* also there is congestion, particularly under the capsule, and a few small hæmorrhages. The glomeruli are congested, while the secreting tubules show marked toxic changes with loss of nuclei and cellular degeneration. The *suprarenals* show much congestion, both of the cortex and the medulla. In the latter, hæmorrhages are to be seen. The cells of the cortex show degenerative changes, loss of nuclei, disappearance of the cells, &c.

The main feature of this case is the extensive streptococcal necrosis of the skin with extension beneath the epithelium. The main characteristics of the lesions are necrosis, hæmorrhage, and œdema. The streptococci are present in large numbers. There is practically no cellular reaction on the part of the body. Other organs show marked toxic changes, and several show small masses of streptococci which formed post mortem. In view of the large numbers of streptococci in the crypts of the tonsils it is to be presumed that this was the source of the streptococcal infection.

BACTERIOLOGICAL FINDINGS

The following specimens were taken for bacteriological investigation: heart blood; excised pieces from various lesions; and fluid from the incised areas. Films from these materials showed the presence of Gram-positive cocci. On culture hæmolytic streptococci were found in almost pure culture. A single drop of the heart blood plated out contained

FIG. 3.—Small lesions and ordinary chicken-pox crusts post mortem.

many thousands of viable streptococci in pure culture.

Cultures were specially taken from the tonsils and the necrotic lesions, and cultured for diphtheria bacilli. No diphtheria bacilli were found, not even in the throat, and this organism can be definitely excluded. No anaerobes of the gas-gangrene group were found in anaerobic cultures from the various specimens.

The streptococcus was extremely hæmolytic, both in cultures and when serum broth cultures were added to a suspension of horse red blood corpuscles, showing the formation of a powerful soluble hæmolysin. It belongs to Lancefield Group A, a group associated with severe human infections. The organism grew very rough and it was difficult to type by the Griffith method, and only after numerous subcultures was it possible to obtain specific agglutination with pooled sera of types in our possession. As individual type sera were not available Dr. V. D. Allison, of the Ministry of Health Laboratory, kindly determined that the streptococcus belonged to Type 23. This strain is not an uncommon type and has been found in scarlet fever, tonsillitis in a girls' school, &c. It occurs sporadically giving rise to localised outbreaks. The strain is very rough and difficult to type.

DISCUSSION

In what has previously been written about varicella gangrenosa little information about the bacteriological cause has been forthcoming. We believe that the condition is due to the infection of the varicella lesion with a virulent micro-organism such as the streptococcus or diphtheria bacillus.

Two distinct types may be noted—one characterised by rapid onset, extensive necrosis, and intense toxæmia, the condition being rapidly fatal within a short time. The present case, due to a hæmolytic streptococcus, belongs to this type, and from its clinical similarity to the cases described respectively by Storrie, Nichols, and Watson, it appears probable that these were also streptococcal in origin.

The second type of case is characterised by a much slower course with the formation of painless punched-out ulcers. Such cases have been described by Krjukoff and Joe in which the infecting organism is the diphtheria bacillus. The clinical appearances differ inasmuch as toxic symptoms appear late in the disease and death is due to diphtheritic myocarditis.

It is possible that other organisms may infect secondarily the varicella lesions, and in all cases of varicella gangrenosa efforts should be made to identify completely the micro-organism concerned.

SUMMARY

(1) A case of massive skin gangrene complicating the early eruptive stage of chicken-pox and rapidly fatal is described. (2) The causal organism was streptococcus pyogenes (Type 23), and the patient had a concurrent and heavily infected streptococcal tonsillitis. (3) This fulminating type of varicella gangrenosa has previously been described, but its ætiology has hitherto been obscure. (4) Less acute types of varicella gangrenosa occur, arising usually in the later stages of the eruption, some of them being associated with a virulent strain of *Corynebacterium diphtheriæ*.

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FATAL PNEUMOTHORAX DUE TO RUPTURE OF A SOLITARY BULLA OF THE LUNG

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SPONTANEOUS pneumothorax occurring suddenly in apparently healthy persons is reported from time to time; but it is rarely fatal and opportunities of determining the nature of the underlying lesions are few. In cases that have been examined post mortem the condition has sometimes been traced to rupture of a subpleural bulla, and the case now reported was of that type. The clinical symptoms were unusual in that they were referred to the abdomen and led to a diagnosis of perforated peptic ulcer.

The patient was a coal-miner aged 29. He was underground shovelling coal when he was suddenly seized with pain in the upper part of the abdomen. He was unable to continue work on account of the persistence of the pain, and five hours later he was admitted to hospital. There was pallor. The respirations were shallow and at the rate of 26 per minute. The pulse-rate was 76. His abdomen was rigid, especially in the right upper quadrant where there was also tenderness. A perforated peptic ulcer was suspected and a laparotomy performed, but apart from some congestion of the appendix no abnormality was found in the abdomen. On the following day respiration became shallower and more rapid, and there was pain in the right side of the chest. The physical signs indicated pneumothorax, and aspiration withdrew 7 litres of air in an hour. The patient's condition improved for a time after the aspiration but subsequently deteriorated, and he died on the second day.

At autopsy there was subcutaneous emphysema over the right side of the chest. The right lung was completely collapsed. At its apex was the familiar appearance of a healed tuberculous lesion, consisting of a fibrous scar in the pleura with puckering of the surrounding lung tissue. From this scar a cord-like adhesion, 1 in. long, extended to the dome of the parietal pleura. Arising from the lung near the point of attachment of this adhesion was a collapsed bulla ¾ in. in diameter. A cannula was placed in the bronchus, and the lung was perfused with water. The bulla became distended and water escaped through a tear ¼ in. long on its summit. The other lung was very œdematous. Microscopic examination showed collapse and commencing broncho-pneumonia in the right lung. All the other organs were normal except the liver in which there were bubbles of air beneath the capsule, the air having apparently reached the liver from the chest wall by way of the falciform ligament.

DISCUSSION

Young (1936) states that "little is known of the pathology of benign or simple pneumothorax. Many writers, chiefly on theoretical grounds, have regarded it as due to rupture of an emphysema bulla near a small area of healed subpleural tuberculosis." The case which has just been described provides substantive evidence in this direction, and a number of other reported cases show clearly that the bulla conclusion is well founded. Thus Weber (1921), who found that pneumothorax in otherwise apparently healthy persons was not rare, regarded it as due to rupture of a minute superficial emphysema bulla resulting from a healed miliary tubercle. He quoted the fatal cases of Dittrich, Pitt, and Zahn in which ruptured bullæ were found post mortem. Fischer-Wasels (1922, 1927), basing his views on post-mortem findings, stated that near a scar at the lung apex there may occur, singly or in greater number, air-containing bullæ up to the size of a cherry. In order that the condition should not be confused with the bullæ of ordinary emphysema he suggested the term Spitzennarbenblasen. Among recent fatal cases of ruptured bullæ may be mentioned those of Tait and Wakely (1935) and Settle (1936).

In addition to the bullæ associated with scarring of the lung there is another type due to congenital malformation. Rupture of these may also give rise to pneumothorax. Fatal cases have been described by Schmincke (1928) and Oechsli and Miles (1934), and others. Thus there is definite evidence that rupture of a bulla, whether due to scarring or congenital malformation, may be responsible for pneumothorax. Radiological investigation also lends support to this view. Gordon (1936) was able to demonstrate bulla-formation in 5 cases of spontaneous pneumothorax. It was not possible to say whether these were the result of scar-formation or of the nature of congenital cysts. He concludes that all the recorded evidence supports the conception that benign spontaneous pneumothorax is due to rupture of a bleb, bulla, or cyst which in the majority of cases cannot be detected during life. Cases in which they could be demonstrated radiologically have been reported by several writers, including Bernou and Neumann (1935), Walinder (1936), and Castex and Mazzei (1935). The latter examined 12 cases in all of which recovery took place. They found bullæ by radiography in three of them, and they conclude that benign pneumothorax affects chiefly males of 20–30 years who are apparently in perfect health. The disease is afebrile and is not associated with any manifestation of tuberculosis.

Bullæ are however not present in all cases. In Wood's (1930) fatal cases only adhesions between the collapsed lung and the summit of the pleura were found. Sergent and Pignot (1930), as a result of clinical and radiological examination in 6 cases, emphasise the importance of the tearing of adhesions caused by latent or healed tuberculosis, and they minimise the importance of ruptured bullæ. Rupture of a bulla they consider must be rare, for the condition is usually seen in young subjects, below the age when general emphysema is met; and this argument has

been used by several writers. A point which may have been overlooked however is that the fatal cases are not necessarily associated with general emphysema of the usual type. They are in fact most often due to localised bulla-formation on the surface of the lung. Ramsbottom (1929) thinks that a bulla such as is seen on the margin of the lung in emphysema would on rupturing collapse and not produce an appreciable pneumothorax, and he believes that pneumothorax arises only in cases in which the ruptured bulla is in free communication with a bronchus large enough and in consequence rigid enough to resist collapse.

An important feature of the present case was the reference of pain to the abdomen and the simulation of the clinical picture of perforated peptic ulcer. Abdominal symptoms are apparently rare in pneumothorax, but they have been noted in a few instances where the cause was pulmonary tuberculosis. Burrell (1931) reports one case which was at first mistaken for a perforated gastric ulcer, and in Shrikhande's (1935) patient there were nausea and vomiting, and pain in the right side of the abdomen. Oechsli and Skillen (1933) have also recorded abdominal symptoms.

The part played by exertion in the causation of pneumothorax is difficult to assess. Friesdorf (1927) analysed 177 cases of non-tubercular pneumothorax which had been published up to 1927. In 67 of these the pneumothorax occurred without apparent cause, and in 69 the onset was associated with bodily exertion. Coughing, crying, sneezing, and laughing were mentioned in another 20, while in 9 the condition developed during walking. In Friesdorf's own patient the pneumothorax came on during the lifting of heavy stones, while in that of Tait and Wakely, pain in the chest developed a quarter of an hour after the lifting of the end of a bed. On the other hand, instances are recorded of the condition developing in an individual at complete rest. Galliard (see Sergent and Pignot) recorded that a young man while at a religious service and in a state of absolute calm was seized with a violent pain in the chest due to the onset of pneumothorax. In the case described in the present paper the question of exertion contributing to the onset was of medico-legal importance since the illness began while the man was at work shovelling coal. At the coroner's inquest the jury returned a verdict of death from natural causes. The coroner, in accepting this verdict, said he disagreed with it, inasmuch as the medical evidence indicated that the exertion of the man's work may have been a contributory cause to his death. A somewhat similar but non-fatal case came before a German court to determine whether an individual was entitled to compensation, and a report of the action is given by Staby (1935).

The claimant was a man of 35 who was sawing poles, dragging them away, and piling them up when he developed dyspnœa. It was subsequently found that he had developed a pneumothorax and a perforation due to rupture of a bulla was diagnosed by endoscopy. The case was complicated in that two years previously the man had received an injury to his chest due to a motor-cycle falling on him. It was decided on experts' reports that the man was not entitled to compensation. Among the reports was that of Prof. Morawitz, who stated that spontaneous pneumothorax is due to inborn changes in the lung, especially cystic enlargement of the alveoli and bulla formation, and that external contribution may be very slight.

SUMMARY

A man aged 29 was suddenly seized with pain in the upper part of the abdomen. He showed the clinical symptoms of a perforated peptic ulcer but post mortem it was found that he had a pneumothorax due to the rupture of a solitary bulla of the lung. The lesion was associated with a scar due to healed tuberculosis.

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SPONTANEOUS PNEUMOTHORAX ASSOCIATED WITH BULLOUS EMPHYSEMA

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OPPORTUNITIES of studying spontaneous pneumothorax in the post-mortem room are relatively rare, and as in this instance the condition was associated with bullous emphysema, diagnosed radiologically in life, an account of the case may be of interest.

The patient, a man aged 35, an air-pilot, was admitted to the Middlesex Hospital under the care of Dr G. E. S. Ward on Sept. 16th, 1936 (No. 97842). Since 1926 he had suffered from attacks of dyspnœa and abdominal discomfort which he had attributed to dyspepsia, and for which he had never consulted a doctor. During the past month he had noticed increasing dyspnœa with abdominal pain and loss of weight, but he had been able to continue flying until two days before admission. There had been no cough or pain in the chest. On Sept. 14th he consulted Dr. T. R. E. Hillier, who found severe dyspnœa and displacement of the heart to the right. On the next day he saw Dr. Evan Bedford and was admitted to hospital as a case of spontaneous pneumothorax.

He had had an injury to the right eye 25 years ago, double pneumonia seventeen years ago, and an hæmoptysis six years ago. There was nothing of note in his family history.

He was a thin man with cyanosis of the lips and some dyspnœa at rest; respirations 24 per minute. There was no fever and the pulse-rate was 80. The chest was rather rigid, with bulging of the intercostal spaces on the left side. The respiratory movements and the tactile fremitus were diminished, particularly on the left. The trachea was displaced to the right, the apex-beat could not be localised on the left, but cardiac pulsation was palpable one inch to the right of the sternum. On percussion, the note was resonant on the right and hyperresonant on the left side of the chest. Cardiac dullness could not be defined to the left of the sternum, but it was found to extend one inch beyond the right sternal border. The breath sounds were harsh and vesicular on the right side with a few basal râles, weak at the left upper zone, and absent at the left base. Vocal resonance was diminished on the left side. A coin-sound could not be elicited. There were no abnormal findings in the other systems.

A diagnosis of left-sided spontaneous pneumothorax was made, and this was confirmed by inserting a needle into the left pleural cavity, when an average pressure of

plus 4 cm. water was found. 400 c.cm. air were aspirated, which somewhat relieved the patient. A radiogram taken on the same day was reported on as follows: "Pneumothorax present on the left side, some fluid is also present at the left base. The upper lobe is prevented from collapsing by an adhesion at the level of the first rib. At the left base there is a large translucent area bounded by lung tissue, which is probably a large emphysematous bulla. At the right base the diaphragm is peaked suggesting adhesions." (The film is reproduced in Fig. 1.) The possibility of the translucent area at the left base being a thoracic stomach was excluded by a barium swallow, which was normal.

There were no appreciable changes in the physical signs during the patient's stay in hospital. Intrapleural pressures were recorded on Sept. 26th and Oct. 20th when the average readings were minus 2 and plus 1 cm. water respectively. 250 c.cm. air was aspirated on each occasion but there was no clinical or radiological evidence of re-expansion of the lung. The bulla, however, varied considerably in size. On Sept. 24th and Oct. 1st it had expanded, but on Oct. 15th it was no longer visible, although a smaller bulla could be seen at a slightly higher level. Its disappearance was due to collapse and not to rupture, since it reappeared on Oct. 18th and was as large as before. On this date a radiogram was taken with the patient lying on the left side, which showed a fluid level in the bulla. The patient left hospital at his own request on Oct. 24th.

He was readmitted ten days later with a history of increasing breathlessness during the preceding twenty-four hours. He was intensely cyanosed and dyspnœic, and the left side of the chest was bulging and tympanitic on percussion. A second spontaneous pneumothorax on the left side was diagnosed and, on inserting a needle into the pleural space, a high intrapleural pressure was found. 2000 c.cm. air was removed and, as the pressure was again positive the next day, a further 800 c.cm. was aspirated, leaving a negative pressure of 6 cm. water. His general condition was greatly improved by these measures. A radiogram taken on Nov. 4th showed the left lung collapsed as before with the bulla still present at the left base. During the next three weeks there was again no change in the physical or radiographic findings in the chest. On Nov. 27th he developed tonsillitis with a pyrexia of 101° F. This ran a normal course, and four days later the inflammation and fever were subsiding, but in the early hours of Dec. 1st the patient died suddenly in his sleep.

POST-MORTEM FINDINGS

The following is an abstract of the post-mortem report (Bland-Sutton Institute P.M. No. 243/36).

General examination showed the body of an adequately nourished man weighing 130 lb. When the sternum was removed the unopened pleura on the left side bulged forward and on incision air escaped, showing that air under positive pressure was present in the pleural cavity. The heart was displaced to the right. The left lung was collapsed except for the apex, which was attached to the parietes by adhesions. At the base of the lower lobe of the left lung there was a large emphysematous bulla about 2 in. in diameter, which remained inflated, and there were two smaller bullæ situated above it (see Fig. 2). There were several adhesions over the pleural surface of the right lung, which was emphysematous. Two small cavities were found in the apex of the right upper lobe. Their origin is doubtful, since there was no surrounding fibrosis and no evidence of tuberculosis was found on microscopical examination. No communication could be demonstrated between the large bulla at the left base and a bronchus, although it would seem probable that such a communication must have existed, since the bulla was seen to vary in size and even to collapse in the serial radiograms taken during life. There was also no evidence of a rupture in the pleura, either tuberculous or emphysematous, to account for the origin and persistence of the pneumothorax. No other abnormality was found.

Death was presumed to be due to a further escape of air into the spontaneous pneumothorax already existing on the left side, causing a high positive intrapleural pressure. The pneumothorax was considered to be emphysematous in origin, in view of the emphysematous bullæ present on the left side and the general emphysema of the right lung. There was no evidence of pulmonary tuberculosis. The adhesions present were probably due to the double pneumonia recorded in the previous history.

Dr. R. A. Young (1936) has recently given a full account of spontaneous pneumothorax in all its aspects. Kjaergaard (1932) points out that there are two main types of non-tuberculous spontaneous pneumothorax: (1) it may be associated with

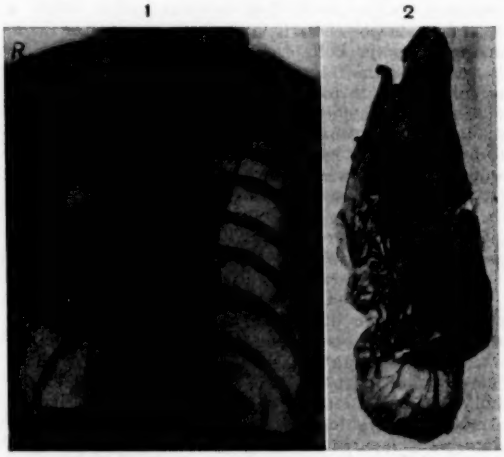

FIG. 1.—Radiogram taken on Sept. 16th, 1936, showing a pneumothorax on the left side. The left lung is collapsed except for the upper lobe and there is a small pleural effusion at the left base. The emphysematous bulla is present at the left base.

FIG. 2.—Photograph of the left lung, posterior aspect, showing the emphysematous bulla at the base of the lower lobe.

generalised emphysema, which is relatively uncommon; and (2) it may occur in healthy persons in whom no gross abnormality can be found in the lungs. The case described belongs to the first type, since there was clinical and pathological evidence of bilateral emphysema with emphysematous bullæ on the left side, and in this type the mortality is higher. The association of spontaneous pneumothorax with emphysematous bullæ was recorded by Ranking in 1860 and by Pitt in 1900. The radiological diagnosis of emphysematous bullæ has been discussed by Freedman (1936). Jacobaeus (1935) shows how difficult this may be, especially when the bulla is large. In the case he describes the correct diagnosis of severe bullous emphysema was only made after thoracoscopy, the clinical and radiological appearances resembling pneumothorax. Abdominal pain as a prominent symptom in spontaneous pneumothorax was recorded by Settle (1936).

It is difficult to assess what part, if any, the patient's occupation as air-pilot may have played in the development of the emphysema. Although, as Beaumont and Dow found in their investigation, subjective improvement usually accompanies compressed-air therapy in emphysema, in this case the patient said his breathing was always easier when he was flying. This is surprising, considering the degree of emphysema present.

SUMMARY

(1) A case of spontaneous pneumothorax, occurring in an air-pilot, is described. (2) Radiography showed a large emphysematous bulla on the affected side. This was confirmed by post-mortem examination,

which also showed general pulmonary emphysema. There was no evidence of pulmonary tuberculosis. (3) The spontaneous pneumothorax was considered to be emphysematous in origin.

Our thanks are due to Dr. G. E. S. Ward and to Dr. D. Evan Bedford for their permission to record this case. We are also indebted to Prof. James McIntosh for particulars of the post-mortem findings, and to Dr. H. K. Graham Hodgson for permission to reproduce the radiogram.

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EXPERIENCES WITH A CONCENTRATED WHOLE LIVER EXTRACT

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THE continued efforts of biochemists to obtain a concentrated liver extract of greater purity and higher concentration for parenteral administration leads to the hope that in the near future the pure anti-anæmic principle will be available for clinical use. In the meantime, the treatment of pernicious anæmia with fractions highly concentrated although still impure is the method of treatment of choice, and one which continues to gain in favour among practising clinicians, both for treatment of cases in emergency and in relapse, as well as for maintenance.

There are many points in favour of the parenteral administration of such concentrated liver products, providing that a reliable product is used. There is the assurance of an almost certain dosage, which is administered under the absolute control of the physician. The preparations are so potent that for practical purposes they replace the need for transfusion, and large doses can be given in the so-called resistant cases. Their relative cheapness and the infrequent injections that are necessary suggest that on grounds of economy alone they are to be preferred. Their convenience for patients on maintenance treatment who are travelling is another point in their favour (Murphy 1933).

In this paper an attempt has been made to assess, from personal experience with one such preparation, the value of this form of therapy. The actual preparation used in these clinical trials was a concentrated solution of liver extract, in which the active principles from a hundred grammes of whole liver are concentrated in 1 c.cm. This dose contains from 9·6 to 11·8 per cent. total solids, with an average of about 10·5 per cent. The total nitrogen content varies from 11·3 mg. to 14·7 mg., with an average of 12·1 mg. per 100 grammes of liver. It should be noted that in stating the concentration of this preparation no reference is made to the question of the difference in therapeutic effect achieved by intramuscular injection as opposed to the effect of liver preparations administered by mouth. A well-known preparation of German manufacture, extensively used in this country, is claimed to contain the anti-anæmic principle from 5 g. of fresh liver, and to have a potency of 500. This, of course, is because the therapeutic effect of parenteral administration is contrasted with that of the oral administration of liver, for all recent clinical reports confirm that when liver is given intramuscularly it is about a hundred times more potent than when it is given by mouth. Upon such a basis of comparison the present product would be equivalent to 10,000 g. of liver given by mouth.

In the following report observations have been made upon:—

1. Cases of uncomplicated pernicious anæmia in relapse or in the first attack.

2. Cases of pernicious anæmia on maintenance treatment.

3. Cases of subacute combined degeneration, both with severe and with slight anæmia.

4. Cases of chronic hypochromic anæmia: (*a*) Idiopathic, presumably with some degree of aplasia and inability to respond adequately to the usual iron therapy; (*b*) Cases of hypochromic anæmia after gastric operations failing to respond satisfactorily to iron therapy.

CASES IN RELAPSE

In most cases a fixed plan of dosage as regards time of administration of the liver product and the intervals between subsequent doses was adhered to.

The clinical investigation and blood count having established the diagnosis and the degree of severity of the anæmia, an initial dose of the extract, usually 2 c.cm. was administered intramuscularly. A further injection was given after an interval of seven days, or even fourteen days in milder cases, but in cases more severely ill the second dose was sometimes given at an interval of less than seven days. Thereafter, as far as possible, injections were given at weekly intervals or multiples of this. During the first 10 days the usual reticulocyte counts were made where possible, but in many cases it was not possible for this to be carried out daily. In cases where daily reticulocyte estimations could not be made, the observations were carried out on the 3rd, 4th, and 5th days, when the maximum response was likely to be seen, and if the percentage of reticulocytes present at this stage was such as to indicate approximately maximal response to treatment, further reticulocyte counts were not made.

In these investigations more attention has been paid to the rate of regeneration of the hæmoglobin and red cells under the influence of the concentrated liver preparation, such observations having been made at intervals of 7 or 14 days as far as possible. In none of the cases recorded was any other form of liver preparation used, nor was the route of administration other than intramuscular. The only supplementary treatment was that, in a few cases indicated in the tables, iron, as in a simple ferri et ammon. cit. mixture, was administered in the later stages of recovery.

In the present series of cases in relapse there are in all observations on 16 patients.

Table I gives details of the age and sex, the initial red count, and the hæmoglobin. The next column shows the first dose of liver extract given, followed by a figure which represents the number of days before a subsequent dose was given. Next follows a column indicating the maximum reticulocyte response actually observed. In this connexion it should be stated that this does not necessarily correspond with the calculated reticulocyte response to be expected, since in a number of cases only a few daily observations were made at about the time when the maximum response should have occurred. In a few cases no reticulocyte observations were made. In the next column are the subsequent doses of liver given in each

case, followed by a figure representing the number of days before further doses were administered The next column summarises the total amount of liver extract given, and the blood count observed at a definite number of days from the commencement of the injections. The actual number of days under observation for each case is shown in the final column.

From this Table, therefore, it is possible to see at a glance the initial blood count, the total dose of liver extract used, together with the days over which observations were made, and the final blood count.

TABLE I

Effect on Cases in Relapse

Case.	Sex and age.	R.B.C. mills/c.mm.	Hb. (per cent.).	Initial dose (c.cm.) and interval in days.	Maximum Reticulocyte count (per cent.).	Subsequent doses (c.cm.) and intervals in days.	Total dose (c.cm.).	Final blood count. R.B.C.	Final blood count. Hb. (per cent.).	Days under observation.
1	F. 47	1·04	22	2 (7)	32	1 (5) 1 (6) 1	5	4·8	92	35
2	F. 67	1·65	44	2 (3)	18	2 (6) 1	5	4·6	80	28
3	F. 46	1·40	24	2 (8)	—	1 (7) 1	4	4·4	80	28
*†4	F. 57	1·13	30	2 (7)	31	1 (7) × 3 (infection). 1 (1) × 7	5 12	2·7 3·7	54 74	28 35
5	M. 52	1·8	45	2 (7)	15	2 (7) 2 (14) 1	7	4·7	90	35
6	M. 47	1·8	44	3 (7)	13·5	2 (14) 1 (14) 1	7	4·8	94	35
*7	F. 43	1·74	42	2 (7)	15	2 (14) 1	5	4·2	78	28
*8	F. 47	2·15	46	5 (21)	—	—	5	4·1	72	21
9	F. 38	0·98	20	2 (4)	34	2 (4) 1 (7) 1 (7)	7	4·45	84	35
10	M. 40	0·90	18	2 (2)	30	2 (7) 2 (7) × 2 1	9	3·9	70	35
*11	F. 60	1·70	40	2 (3)	—	2 (4) 2 (4) "influenza." 1 (7) × 3	6 9	3·1 4·7	66 90	28 42
12	M. 63	1·7	42	3 (7)	16	2 (14)	5	4·9	100	28
13	F. 36	2·5	56	2 (7)	7	2 (14) 2 (21)	6	4·4	90	49
*14	F. 56	2·0	50	2 (7)	—	1 (14) × 2	4	4·0	74	35
15	F. 53	1·0	30	2 (4)	28	2 (4) × 3 2 (7)	10	4·6	88	35
†16	M 47	1·9	48	2 (4)	15	2 (7) 1 (7) × 2	6	4·5	92	35

* These cases also received short courses of iron before transfer to the out-patient maintenance clinic.
† These cases were not subsequently observed on maintenance treatment.

All the patients treated made a satisfactory recovery, and with the exception of two, all came under subsequent observation in the out-patient department for maintenance treatment, and they are included among the cases dealt with in the next section under maintenance treatment.

Results.—From Table I it will be seen that from 2 to 5 c.cm. of the concentrated liver preparation given intramuscularly was enough to produce a satisfactory reticulocyte response in all cases observed; and that after-treatment consisted of from 1 to 2 c.cm. of the concentrated extract repeated usually at intervals of a week, though in a few cases strict adherence to this seven-day interval was not observed. Cases 4 and 11 were complicated by infections, and had more frequent and larger doses. In 13 of the remaining 14 cases the red cell count reached 4,000,000 per c.cm. or more in 21–35 days, except in one case where it reached 4,400,000 in 49 days. The other patient receiving a total of 9 c.cm. reached 3,900,000 in 35 days. Four patients had subsequent doses of iron by mouth for two or three weeks. The later progress of all the cases was satisfactory, and except for Cases 4 and 16, they form the bulk of the cases subsequently observed on maintenance treatment.

MAINTENANCE TREATMENT

Since the introduction of liver therapy the satisfactory maintenance of cases of pernicious anæmia undergoing treatment has always been recognised as of paramount importance, no matter what the route of administration. So far as the blood is concerned it is agreed that the red cell count and the percentage hæmoglobin should be maintained if possible at normal levels. This is especially desirable if neurological complications are to be prevented, or if they are present, arrested and improved. It is important to observe that the subjective sensations of the anæmic patient are particularly fallacious as a guide to improvement, for many once severely anæmic patients will state that they are perfectly well in every respect with red cell counts considerably below normal values.

A study of maintenance treatment must necessarily be prolonged, and such work is more tedious and much less dramatic than the observations of the immediate results of treatment in well-developed and severe anæmic states of new or relapsed cases. It is, however, probably equally important.

The hæmatological criteria adopted during these observations were that the red cell count should be at least between 4,500,000 and 5,000,000 per c.cm. and that the hæmoglobin should be at or above 95 per cent. A fall in the red count below 4,500,000 was regarded as suggestive of early relapse, and indicated increased dosage of the liver preparation. More reliance was placed on the cell counts than upon a fall in the hæmoglobin percentage, because although a fall in hæmoglobin is usually accompanied by a fall in red cells, these two observations are not always strictly paralleled in the initial phases of relapse. When such a fall in the blood was observed during maintenance a careful scrutiny for complicating factors, particularly of an infectious type, was always made. In their absence it was assumed that either the amount of substance given was insufficient, or, in the scheme of treatment adopted here, that the intervals between doses were too long and had therefore to be reduced.

All the acute cases mentioned in Table I, with the exception of two, were kept under continuous observation for periods varying from twelve months upwards. In addition, 6 other cases of pernicious anæmia previously maintained satisfactorily on other preparations were transferred to the new product and were similarly observed, again in all cases for periods exceeding twelve months. In Table II are shown in all 20 cases. In addition, there were three other cases not included in this table in whom the development of severe intercurrent illness rendered them unfit for comparison with the other cases in that the scheme of dosage had to be entirely and permanently abandoned.

The following plan with regard to dosage and the time intervals between injections was adopted.

When the new cases or those in relapse were treated and had reached counts at or above 4,500,000 red cells per c.cm., they, and those transferred cases, were seen in the out-patient clinic once every 3 weeks. They all received 1 c.cm. of a concentrated liver extract intramuscularly, and were seen every 3 weeks, in most cases four times in all, covering a period of 12 weeks. If the blood was still satisfactory the interval was then increased to 4 weeks, these cases being seen three times over a further period of 12 weeks. Again if the blood was satisfactory the interval was increased to 5 weeks, and thereafter at suit-

able intervals to 6, 7, and in one case, even 8 weeks. A fall in the red count was met, not by increasing the amount of liver given, but by shortening the time interval between injections. A fall in the hæmoglobin, without significant change in the red cells, was met by prescribing iron by mouth for two or three weeks, and if the red count and hæmoglobin showed no improvement the interval for the liver injections was again shortened.

After experimenting thus for more than a year with most of these cases, it was possible to arrive at an interval

TABLE II

Cases Maintained on 1 *c.cm. Concentrated Liver Extract*

Case.	Number of 1 c.cm. doses in weekly (w.) intervals of—						EMI in weeks.	Time in weeks observed on EMI.
	3 w.	4 w.	5 w.	6 w.	7 w.	8 w.		
1	4	3	2	2	1 + (4)	..	7	35
2	4	3	2 + (4)	1*	..	..	5	20
3	4	3	3	2 + (5)	1*	..	6	30
5	4	3	2	2 + (6)	2*	..	6	30
6	4	3‡	2 + (7)	1*	..	..	5	35
7	4	3	2	2	2	(4)	8	32
†8	4	3 + (11)	2*	..	..	..	4	44
9	4	4	3 + (5)	1*	..	..	5	25
10	3	3	2	2	6	..	7	42
11	4	3 + (10)	2*	..	..	..	4	40
12	4	3	2	2 + (6)	1*	..	6	36
†13	4 + (14)	3*	..	..	..	..	3	42
14	4	3 + (8)	2*	..	..	..	4	32
15	4	3 + (9)	1*	..	..	..	4	36
17	2	3	2	2 + (6)	1*	..	6	36
†18	3	3 + (8)	2*	..	..	..	4	32
19	2	3	2	2 + (7)	2*	..	6	42
20	3	3 + (9)	2*	..	..	..	4	36
†21	4 + (12)	3*	..	..	..	..	3	36
22	4	3 + (8)	2*‡	2*	..	..	5	32

Figures in parentheses show period maintained on fixed 1 c.cm. dose *after* this had been determined by trial.
EMI = Established maintenance interval.
* Trial period interval found too long by R.B.C. fall, interval therefore reduced.
† interval reduced on account of paræsthesiæ; blood satisfactory.
‡ Influenza; double dose here on one occasion.

between injections satisfactory for each case, using always a fixed dose of 1 c.cm. The only exception to the rule of a fixed dose of 1 c.cm. in the cases shown in Table II was made in two cases indicated, who at one stage developed influenza-like infections, and to each of whom a double dose of the liver substance (2 c.cm.) was given on one occasion.

Results.—The established maintenance interval on a dose of 1 c.cm. was found in 17 cases by increasing the interval until evidence of slight remission was obtained. In 3, the established maintenance interval was arrived at without any evidence of slight relapse, and it is possible that in the future further extensions of the interval may be safely considered. It will be seen that in 2 cases the established maintenance interval was three weeks, in 6, four weeks, in 4, five weeks, in 5, six weeks, in 2, seven weeks, and in 1, eight weeks. The period of observation up to the time of compiling these records (April, 1937) has varied from 20 to 44 weeks.

There were 9 cases who showed some evidence of subacute combined degeneration of the cord, but in 5 the symptoms were quite trivial, and had disappeared by the time the patients were transferred for maintenance treatment. In 4 other cases, however, persistent paræsthesiæ and some loss of postural sense were found extending into the time when the blood-level was satisfactory.

SUBACUTE COMBINED DEGENERATION

From one point of view the presence of subacute combined degeneration of the cord in cases undergoing treatment tends to complicate clear deductions as to the value of a given preparation, inasmuch as it is usually maintained that the control of neurological complications depends upon the utilisation of optimal amounts of liver substance. Hence the inclination of the physician is to give far in excess of what is required to maintain the blood at its optimum.

It has already been mentioned that 5 cases among the severely anæmic patients had transient peripheral paræsthesiæ, doubtless due to mild peripheral nerve disturbance, "anæmic peripheral neuritis"; these quickly lost the symptoms and no nervous disturbance could be discovered at the time of discharge to the out-patient maintenance clinic. The remaining cases to be discussed in this section fall into two groups.

There were four patients, Cases 8, 13, 18, and 21, (the first two appear in Table I; the others are cases transferred to this preparation for maintenance) treated in the acute stage, in whom persistent paræsthesiæ and some loss of postural sense were found at the time of transfer to the out-patient maintenance clinic. In none of them was the plantar response ever known to be extensor, nor was there any other evidence of central pyramidal disease. All four cases have responded satisfactorily from the neurological point of view, as well as in the condition of the blood. They have lost their subjective and objective sensory disturbance, except in one case where there is still slight numbness of the first and second fingers of the right hand. The dosage of the active liver preparation which has maintained these patients in their present satisfactory condition for a period of more than six months has been :—

Case.	Dose, c.m.	Interval in weeks.	Observation in months.
8	1	5	9
13	1	4	10
18	1	3	8
21	1	3	9

In all four cases the blood has never at any time fallen below 4,500,000 red blood cells per c.cm., and has usually been above 5,000,000.

There was another group of four new cases, not included in the previous tables, in whom there was little or no anæmia, and whose chief complaints were those of severe paræsthesiæ, ataxia, or spasticity, and in whom routine examination of the blood revealed slight, and in two cases only very slight, evidence of pernicious anæmia. The general features of these cases were that their history of the development of paræsthesiæ, ataxia, and difficulty in walking extended from one to three years. They all had complete achlorhydria, and they may be considered as cases primarily neurological in their clinical aspect. I am indebted to Dr. H. G. Garland for the histories of two of these cases.

CASE 23.—A female, aged 60, with one year's history of paræsthesiæ and ataxia, loss of vibration and postural sense in the legs, absent knee- and ankle-jerks, bilateral extensor plantar response, quite unable to stand or walk. Red cells 3,800,000 per c.cm., hæmoglobin 76 per cent. She had 1 c.cm. of the concentrated liver extract daily for 6 weeks, then 1 c.cm. twice weekly for 2 months, and at the end of this time was able to walk upstairs with assistance, but still had paræsthesiæ. She continued to have 1 c.cm. twice weekly for 4 months, and is now able to mount stairs unaided. The knee- and ankle-jerks have returned, and the plantar responses are now definitely

flexor. She is now having 1 c.cm. weekly. The red-cell count has been satisfactory throughout from the beginning of treatment.

CASE 24.—A male, aged 64, who complained for eighteen months of paræsthesiæ and a cold, dead, aching in the legs, and of tingling numbness in the fingers, with clumsy action of the hands. On examination the knee- and ankle-jerks were not obtained. There was loss of position and vibration-sense both in the hands and feet. The blood count was red cells 4,600,000, hæmoglobin 88 per cent. There was histamine achlorhydria. The cerebro-spinal fluid was normal. After six weeks on a daily injection of the concentrated liver extract there was pronounced subjective improvement. The tendon reflexes could now be obtained, but there was still slight paræsthesiæ. Further treatment consisted of 1 c.cm. twice weekly, the last blood count being red cells 5,100,000 per c.cm., hæmoglobin 98 per cent.

CASE 25.—A male, aged 50, seen fifteen months ago complaining of difficulty in walking and unsteadiness of gait, and on questioning admitted to feelings of numbness in the hands and feet. Although clinically his appearance did not suggest anæmia, his red-cell count was 3,600,000 per c.cm., hæmoglobin 82 per cent., colour-index 1·1. He received 5 c.cm. of the concentrated liver extract spread over a period of four weeks, at the end of which his red-blood count was 4,900,000 per c.cm. and hæmoglobin 90 per cent. He still complained of some unsteadiness in his gait, his knee- and ankle-jerks were very sluggish, and his plantar response equivocal. He has continued to have 2 c.cm. of the extract at four-weekly intervals. His blood has never fallen below 4,500,000 per c.cm., his hæmoglobin never below 96 per cent. He has slowly improved in his walking, is much more steady, and his tendon reflexes are normal. His plantar response is flexor.

CASE 26.—This is a case which, in spite of intensive liver therapy at all times adequate to maintain the blood at normal levels, continued to retrogress. He was an organ builder, aged 58, and complained of aching pain down the front of the right leg and later similar discomfort in the left. He began at times to walk clumsily as if drunk, and he became clumsy with his hands, in the use of his knife and fork, and was eventually unable to do his rather delicate work concerned with the adjustment of organ pipes. He had physical signs of subacute combined degeneration of both spastic and ataxic type, with extensor plantar responses. His knee-jerks and one ankle-jerk were brisk, but the ankle-jerk on the right side was obtained only with difficulty. When first seen his blood count was 4,400,000 red cells per c.cm., hæmoglobin 88 per cent., colour-index 1, white cells 5700 per c.cm. There was slight megalocytosis of the red blood cells, histamine achlorhydria, and a normal cerebro-spinal fluid. Before treatment could be instituted in this case the patient developed a severe carbuncle on his back requiring in-patient surgical treatment for six weeks. During this time he was given 2 c.cm. of the concentrated liver extract daily for two weeks, and then 1 c.cm. twice weekly, his blood count being 5,100,000 per c.cm., hæmoglobin 96 per cent. When he was able to get up his unsteadiness of gait had increased, and it was only with considerable assistance that the patient was able to walk. At this stage the concentrated liver extract treatment was augmented with vitamin B_1 in the form of two ampoules of Betaxan daily. The carbuncle has been completely healed for four months, but the patient is still deteriorating, and with increased ataxia and incoördination and loss of sphincter control has become bedridden.

HYPOCHROMIC ANÆMIA

On theoretical grounds there is strong objection to the haphazard use of liver products in hypochromic anæmia states which ordinarily respond to large doses of iron. In the following six cases, however, this liver product was used, because in the treatment of their anæmia over many years with large doses of iron, satisfactory improvement was not achieved. The hæmoglobin level remained persistently low in spite of continuous massive iron therapy. In two cases, the use of more than 30 grains of ferri et ammon. cit. three times a day was impossible owing to the tendency of the drug to cause gastro-intestinal disturbances, particularly diarrhœa.

In the first case there was a colour-index of 0·6, and the hæmoglobin level was never raised above 32 per cent. over a period of three and a half years. In both cases massive iron therapy had been repeatedly employed. They had been fully investigated as in-patients, and there was no evidence of any form of blood loss such as chronic gastro-intestinal hæmorrhage, nor was there any history of a toxic agent which could be conceived as operating to produce an aplastic state of the marrow. The full hæmatological investigations did not suggest any unusual blood disorder. In both cases there was achlorhydria. To each of the patients 1 c.cm. of the liver concentrate was given at fortnightly intervals. The iron mixture was not discontinued, but simultaneously administered. Slowly the hæmoglobin began to rise, accompanied by an improvement in the state of the patients, and after six months' treatment the hæmoglobin level had risen, in the first case to 66 per cent., and in the second to 65 per cent. Having regard to the chronic and long-continued ill health of these patients, to the extremely low hæmoglobin values, and the resistant character of the disorder to ordinary iron treatment, these elevations of hæmoglobin were a notable achievement, and as a result of it the patients, although strictly speaking still anæmic, are now in a much better condition than they have been for many years.

The other four cases are examples of hypochromic anæmia following gastric operations.* In these patients the story has been much the same. Iron therapy has never succeeded in raising the hæmoglobin above 50 per cent.

In two of them there was considerable intolerance to large doses of iron, which from time to time had to be omitted. Under the influence of the concentrated liver extract again the hæmoglobin value has been elevated, in the first case to 65 per cent., in the second case to 72 per cent., in the third case to 78 per cent., and in the fourth case to 68 per cent. Accompanying this improvement in the blood was an improvement in the symptoms—i.e., excessive tiredness and lack of energy, and the physical activities of the patients have been much increased. Having long adapted themselves to the previous low blood values, they are now in a relatively healthy condition.

CONCLUSIONS

A concentrated whole liver extract for intramuscular injection has been systematically tested among cases of pernicious anæmia. Relatively small doses rapidly produced an adequate reticulocyte response followed by a rapid regeneration of red cells and hæmoglobin among 16 severely anæmic patients. Satisfactory maintenance treatment has been observed among 20 cases of pernicious anæmia on small dosage at various intervals between injections. The need for careful control of maintenance cases by regular blood counts is shown by the variation in the time interval between injections in the different cases, the time interval between 1 c.cm. doses ranging from three to eight weeks. Because of this variation it is impossible to fix a standard dose and interval applicable to every case. Intercurrent infection nearly always demands an increased amount of active substance to maintain satisfactory blood levels.

All the cases with subacute combined degeneration of the cord, except one which was complicated by severe infection, have improved. It is suggested that the "primary neurological" cases, with evidence of nervous disturbance much in advance of the anæmia,

* I have previously reported a number of similar cases in a review of 40 examples of anæmia following gastric operations (Hartfall 1934).

(*Continued at foot of opposite page*)

BRITISH MEDICAL ASSOCIATION

SECTION OF PATHOLOGY, BACTERIOLOGY, AND IMMUNITY

Prof. S. P. BEDSON, F.R.S. (London), presided over this section, and a discussion on

Influenza

was opened by Dr. C. H. ANDREWES (London). He proposed, he said, to show that a definite disease could be separated out from the scrap-heap of epidemic upper respiratory tract infections by recognition of its virus ætiology. He described the course of the disease produced in ferrets by intranasal instillation of saline garglings from patients in the early stages, and the subsequent infection of other ferrets by filtered emulsions of the turbinates. Serial passage could give rise to a virus causing extensive bacteriologically sterile lung lesions. This virus would infect mice, causing lung lesions only; and sometimes the recently isolated strains could be adapted to infect mice. Virus might be present in mouse lungs which appeared normal. The evidence that this virus was the cause of human influenza epidemics was (1) the frequent recovery of it from patients in some epidemics, and failure to recover it from normal persons or in sporadic cases; (2) its presence in epidemics from all over the world; (3) the acquisition of virus-neutralising powers by the serum of convalescent patients; (4) successful infection of the human subject; and (5) the failure of Pfeiffer's bacillus in an ætiological rôle.

Immunologically, ferrets developed antibodies after recovery; these waned after six months. Although infection would occur only by the intranasal route, virus given subcutaneously would produce some immunity. The waning immunity of previously infected ferrets could be made complete by one subcutaneous dose of vaccine. In mice, protection against the lung lesions for ten weeks could be given by two injections. Virus inactivated by 1 in 5000 formaldehyde was an effective antigen. In vaccinating human beings it was preferable to use such an inactivated virus; a single dose caused a satisfactory rise in antibodies, averaging 25-fold, without undue local reaction. An attempt to test the value of the vaccine last December had been vitiated by the arrival of the epidemic within a few days of the injections. A new complication had arisen with the discovery that all strains of the human influenza virus were not serologically identical, though showing considerable antigenic overlap. It might be hoped, however, that an effective prophylactic would be found.

Dr. C. H. STUART-HARRIS (London) described the clinical features of four localised epidemics of upper respiratory infection in which the virus could not be implicated, and of the epidemic of December, 1936, from which virus was isolated. He thought that in the latter a clinical entity could be defined, because of the uniformity of the picture, and because of the differences between it and the non-virus outbreaks. He pointed out that the symptoms, the duration and type of pyrexia, and the lung changes observed in the virus disease in man and in the ferret presented certain similarities. Human cases with frank pneumonic signs usually ceased to yield virus, and pneumococci were then often found. While there was some serological evidence of the occurrence of subclinical infections, in no case with gastro-intestinal symptoms only had virus been demonstrated. Compared with the non-virus group of infections, the influenza epidemic tended to a more explosive onset, and a rapid course, with small secondary waves; the individual cases were more uniform in clinical type than in the "febrile catarrhs." The symptoms of onset were more often constitutional than respiratory in influenza; the symptoms during the course of the two diseases were less easily distinguishable. The blood count was of no help in diagnosis.

Dr. R. W. FAIRBROTHER (Manchester) said that diagnosis was easy during epidemics, but sporadic cases were difficult. In considering immunisation, it should be recognised that many people have some antibodies, and he recommended testing for antibodies and vaccinating those with a low titre. Observation had shown that it was these who would develop influenza. Of the two serological diagnostic tests, the complement-fixation test was more useful than the neutralisation test, requiring the use of fewer mice. The results of the two tests did not always agree. On centrifuging, a filtrate yielded two antigenic substances; a soluble substance, non-infective and not antibody-producing, but causing complement fixation, and an infective deposit, presumably containing elementary bodies, which induced antibody-formation but no complement fixation. The activity of the deposit was just destroyed by a temperature of 50° C., but not by phenolisation. Two doses of a preparation of this gave protection in mice. As mouse tissue was undesirable in the vaccine, virus grown on egg embryo had been tried; this was effective in mice, but not satisfactory in ferrets. No observations had yet been made in man. Immunity was only of brief duration, and he repeated that when an epidemic was expected, the vaccine should be used for those persons found to have a low antibody titre by the complement-fixation test.

Dr. J. G. SCADDING (London) spoke of the lung changes in influenza. He had observed a series of cases during the last epidemic, mostly with lung involvement. The virus had been isolated from four of these. A comparison was made between the gross bacterial flora of the sputa in this influenzal group and that of a control group composed of all the non-influenzal sputa examined in the laboratory during the same period. No significant difference between the two groups was found. On analysing the influenzal series into groups according to the nature of the pulmonary lesion, significant differences between the bacterial flora of the various groups were found, pneumococci predominating in those with definite consolidation. In a fatal case of fulminating pneumonia, both virus and *Staphylococcus aureus* had been demonstrated in the lung. He concluded that the

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may require larger doses irrespective of the satisfactory state of the blood.

The improvement of certain cases of resistant hypochromic anæmia suggests that the preparation may have some specific stimulant effect upon the metabolism of iron.

I am indebted to the Lederle Laboratories for all the supplies of the concentrated liver solution used throughout these tests, and to Dr. E. F. Roberts and Dr. G. W. Clark for information relating to its preparation and composition. I wish to thank Dr. G. Bonsor, pathologist to the Leeds Public Dispensary and Hospital, and to Dr. C. Polson, pathologist to St. James's Hospital, Leeds, for several of the blood counts done among acute cases whilst in-patients in these hospitals.

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lung changes were the result of both bacterial and virus infections, in varying combinations of severity. Consideration of the histology of the lungs in seven fatal cases gave some support to this hypothesis.

The PRESIDENT said that the differences between the various strains of virus might be of academic interest only. Differences between the neutralisation and complement-fixation tests had been found with the psittacosis virus also.

Dr. C. E. VAN ROOYEN (Edinburgh) said viruses commonly rendered cells very liable to secondary infection, quoting those of ectromelia and psittacosis as examples. He had failed to obtain complement fixation with the elementary bodies of vaccinia.

Dr. ANDREWES, in reply, said that the difference between strains of virus was evident not only in mouse experiments, but also in the vaccinated human subject. In prophylactic schemes, a difficulty was to forecast the imminence of an epidemic. A test for this would be useful.

Dr. FAIRBROTHER, in reply, said that the complement-fixation test was adapted to the facilities of the small laboratory. All strains produced the same antigen for this test. Variations in strains had been produced by animal passage. If a large enough dose were given, a polyvalent vaccine would not be needed.

Staphylococcal Infections

Prof. J. W. BIGGER (Dublin) opened a discussion on staphylococcal infections in man. He began with a brief account of recent advances in knowledge of the staphylococci and their toxins, leading on to the importance of the exotoxins, the methods of culture necessary for their production, the possibility of immunisation by toxoid, and the preparation of an effective antitoxin. He outlined the present state of knowledge of the constitution of the exotoxin, and discussed the possibility of hypersensitivity to the toxin. He commented on the absence of reference to opsonins in the last fifteen years; he still thought there might be some antibacterial immunity. Staphylococcal infections, he said, might be endogenous or exogenous; general infection might follow, and there might be some effect on sugar metabolism. The factors determining infection were the virulence of the organism, trauma, the level of immunity, and local conditions such as the state of the skin glands. Thus different levels of antitoxin were needed in different subjects. In treatment locally, rest was most important. Active immunity could be produced by toxoid which must include α toxin, leucocidin, and probably β toxin. Control by hæmolysin titration was unnecessary. Vaccine might be useful; he used it in the form of washed organisms, with the toxoid, to increase antibacterial substances.

Dr. H. J. PARISH (Beckenham) said that laboratory evidence confirmed the value of toxoid and antitoxin. Most vaccines contained little toxin, and experimentally there was little justification for their use. The antitoxin in common use neutralised both hæmolysin and leucocidin. The early clinical results from toxoid had been encouraging, but relapses might occur in spite of a high antitoxin level. In sycosis, results had been poor; they had been better in furunculosis. Knowledge of the toxins was incomplete, and the toxoid might lack some essential antigen. Turning to chemotherapy, Dr. Parish produced experimental evidence of the efficacy of sulphanilamide, administered orally, in mice infected intraperitoneally with virulent strains of staphylococci. The results were comparable with or superior to those obtained with antitoxin. Mice surviving the acute stages were often found to have abscesses in various organs. The results of sulphanilamide therapy were comparable with those obtained in hæmolytic streptococcal infections. Delay in instituting therapy much reduced its efficacy. He concluded that sulphanilamide may be of value in staphylococcal infections.

Dr. EILEEN BARTLEY (Belfast) gave a report on 68 cases of various superficial staphylococcal infections treated with toxoid. The best results were obtained in cases of styes and furunculosis; results were poor in sycosis and acne. The average anti-hæmolysin titre before treatment was 1 unit, and after treatment for eight weeks, 8 units; there was no correlation between the rise in titre and the clinical results. No further rise in titre occurred with further treatment. The toxoid was of some value, but not entirely satisfactory.

The PRESIDENT said that three questions arose: whether antitoxic immunity was the whole story; the importance of hypersensitivity; and the value of sulphanilamide. Staphylococci might be capsulated, with a capsular antigen.

Dr. S. C. DYKE (Wolverhampton) agreed that anti-hæmolysin titre was of no clinical value, and its estimation was therefore unnecessary. He had obtained good results with vaccine. Prolonged observation had convinced him that there was no special relation between diabetes and staphylococcal infections.

Dr. EILEEN HICKEY (Belfast) recounted a recent case of staphylococcal septicæmia controlled with Prontosil, in which a recrudescence occurred several times on omitting the prontosil.

Sir THOMAS HOUSTON (Belfast) said that he still believed in the efficacy of the vaccine. He stressed the importance of accurate bacteriological diagnosis.

Dr. H. G. DAIN (Birmingham) urged the importance of focal infection in maintaining chronic staphylococcal infections.

Colonel A. H. PROCTOR (London) quoted two cases of osteomyelitis which developed furuncles in the presence of a very high antihæmolysin titre. He had attempted, without success, to obtain some help clinically from estimation of the bactericidal power of the blood. He thought that secondary infection of staphylococcal lesions was a real danger, quoting a case in illustration.

Dr. N. C. GRAHAM (Belfast) supported Sir Thomas Houston's plea for accurate bacteriological diagnosis.

Mr. A. FELIX, D.Sc. (London), said that too much stress had been placed upon antitoxin titres.

Prof. BIGGER, in reply, said that variations in results of vaccine treatment were due to variations in toxin production with different culture methods. He thought the α-hæmolysin had received too much attention; other constituents, especially the leucocidin, might be more important.

SECTION OF PHARMACOLOGY AND THERAPEUTICS

WITH Prof. E. B. C. MAYRS (Dunmurry), the president, in the chair, a discussion on

Individual Variations in Response to Drugs

was opened by Prof. A. J. CLARK, F.R.S. (Edinburgh). He said that the actual range of individual variation in the response of patients to various therapeutic methods had not been very fully stated. Most of the work had been on animals and certain conditions must be fulfilled before the results can be relied upon.

The animals must be a uniform population from inbred stock, and similar in sex, weight, and age. The nature of the diet was also important; for example, vitamin deficiency increased the susceptibility of animals to many drugs. Even when all these precautions were taken animals still showed a wide variation in their response. In the case of strychnine poisoning it had been shown that of adult animals of mixed sexes 4 per cent. were killed by about a quarter of the dose that 4 per cent. survived.

Prof. Clark then dealt with various mathematical conceptions involved in the calculation of individual susceptibility from the results obtained on small groups. With most drugs, the range of variation was relatively narrow so that a dose equal to 40 per cent. of the mean lethal dose would not kill more than 1 in 10,000 individuals. With dysentery toxin, however, the variation was so great that a very small fraction of the mean lethal dose sufficed to kill susceptible individuals. In the case of human beings very little was known about variations in lethal doses. The animal experiments, however, were of service in that they showed that the mean lethal dose is a quantity that cannot be measured accurately. Rather more was known regarding variations in the effect of narcotics. It should be expected that in 1000 cases the most resistant individual would require about four times the dose needed by the least resistant. Therefore those methods in which the dosage can be adjusted to the individual response, such as the administration of volatile anæsthesia on a facial mask, were to be preferred to those in which a standard dose has to be given to all patients as, for example, a basal dose of Nembutal calculated from the weight of the patient. With alcohol there were big differences between the results obtained with animals and those obtained with human beings. Animal experiments gave a relatively small variation in response to alcohol. In human beings a concentration of alcohol in the blood of 1·2 mg. per 100 c.cm. produced intoxication in 50 per cent. of cases. At the other end of the scale, 1 person in 35 was not intoxicated with 4·5 mg. per 100 c.cm. No doubt a proportion of the human population had an acquired tolerance. In regard to massive digitalis therapy the evidence suggested that in different individuals at least a fourfold range in the quantity of the drug would probably be required to produce a given effect. Consequently it appeared very improbable that any method would be found of judging a priori the dose needed accurately enough to ensure that the average therapeutic dose would not produce severe overdosage in the occasional patient who was abnormally sensitive. These exceptional people were undoubtedly a nuisance from the clinical standpoint, but their existence must be recognised.

Prof. J. H. GADDUM (London) dealt with the method of determining what proportion of the average lethal dose is safe for every individual by extrapolating a curve whose shape has been determined for a small population. This method gave ridiculous results when applied to the highly skewed curves sometimes obtained. These curves could, however, usually be converted into sigmoid curves if they were plotted on the logarithmic scale rather than the arithmetic scale. He said that the variability in response of a given population of rats to one drug might be quite different from their variability to another drug.

Dr. GEORGE GRAHAM (London) dealt with variations in response of patients to insulin. He described various types of local reaction. Some of these were due to the preparation not being isotonic, but this type of reaction had been almost abolished by the universal acceptance by manufacturers of the importance of isotonicity. Other local reactions were due to unknown components of individual preparations. They could usually be avoided by changing the brand of insulin, but sometimes the only course was to desensitise the patient. It was impossible to tell even approximately from the height of the blood-sugar in a given case of diabetes what dosage of insulin would be required for stabilisation.

Dr. P. MCCARVILL (Dublin) said that a considerable part of a dermatologist's time was taken in treating the effects of unexpected responses to drugs administered externally or internally. The reason that the dermatologist saw so many cases was because he dealt with those cases in which unusual response was manifested externally. The cells of the skin could be sensitised to a wide variety of substances, even to relatively simple substances. Primula antigen for example had a molecule very much smaller than a protein molecule, but yet it had been shown that 100 per cent. of people could be sensitised by rubbing concentrated solutions into the skin. Sensitisation might take years to develop, and it might be transferred. Most reactions could be avoided by testing for undue sensitivity by means of the patch-test or the scratch-test. The development of exfoliative dermatitis from gold therapy could almost always be avoided if certain warning signs were carefully watched for.

The PRESIDENT said it would be a great advance if some simple means could be devised in practice for testing quantitative differences in response. He wished to draw attention not only to variations in susceptibility but also to variations in resistance to a drug. Some patients who appeared not to show any favourable response to the pharmacopœial dose required larger doses.

Dr. P. C. P. INGRAM (Newport) referred to variations in susceptibility to the arsenobenzols. A lot of reactions had been prevented by more efficient methods of administration, and a lot more could be avoided by insisting on starvation before and after treatment and on the patient's resting for some hours after an injection.

Dr. J. F. BROCK (Cambridge) asked whether susceptibility to drugs such as that shown by development of agranulocytosis after taking amidopyrine should be regarded as inherited or as induced.

Prof. H. C. RAPER (Manchester) discussed responses to mustard-gas in relation to Dr. Brock's question. Certain people had been found to be five times as susceptible as others to this poison. This must be an inherited susceptibility because none of the subjects had previously been exposed. On the other hand, people used repeatedly for testing batches of mustard-gas had developed hypersensitivity which was induced.

Prof. DAVID CAMPBELL (Aberdeen) held that the attempt to prescribe digitalis in terms of the patient's weight was a spurious form of accuracy because it ignored individual variation. The same applied to basal anæsthetics. He appealed against the use of mixtures of drugs, such as a combination of a barbiturate and an analgesic, and held that drugs should be used individually and the dose increased until an effect was obtained.

Iron

Dr. BROCK read a short paper on iron therapy in hypochromic anæmia. He pointed out that the hypochromic anæmias which responded to iron therapy

had all the characteristics of iron-deficiency states. The only difficulty in accepting iron-deficiency as the main causal factor had been the fact that very large doses were required. The work of Health, Strauss, and Castle on the response of such patients to injections of iron had led to the assumption that the reason why large doses required to be given by mouth was that iron was very poorly absorbed from the human gastro-intestinal tract. The balance experiments of Brock and Hunter, confirmed by Fowler and Barer and by McCance, made it clear that this explanation was inadequate. Iron had been found to be very well absorbed from the human gastro-intestinal tract. The difficulty, therefore, still arose as to why it was necessary to give large doses. There could be no doubt about the correctness of this conclusion from clinical experiments. He suggested that the explanation probably was that one group of cases represented a simple state of iron-deficiency, which could be cured by small doses, whereas in the other group there were factors, not yet identified, which made large doses of iron necessary. There was no clinical way of differentiating between the two groups, so that the average effective dose must still be regarded as a large dose.

SECTION OF ANATOMY, PHYSIOLOGY, AND BIOCHEMISTRY

AT a meeting of this section Prof. JOHN MORLEY (Manchester) opened a discussion on

Visceral Pain

He would limit his remarks, he said, to the mechanism of visceral pain from the diagnostic aspect, and deal for the most part with pain originating in the gastro-intestinal tract. This problem was a peculiar one, inasmuch as the gastro-intestinal tract was quite insensitive to the stimuli—cutting, burning, &c.—which caused pain when applied to the somatic nerves; yet it was supplied with afferent nerve-fibres capable of causing direct visceral pain in response to an adequate stimulus. The one stimulus adequate to produce this direct visceral pain in the gastro-intestinal tract appeared to be tension on the afferent nerves in its muscular coats, and this tension was usually caused by spasmodic and exaggerated peristaltic contraction. The afferent nerves supplying the insensitive intra-peritoneal viscera showed no anatomical features distinguishing them from the somatic nerves, but their physiological limitations were so striking that we are justified in regarding them as a separate system, to which we may give the name "viscero-sensory nerves."

The features of visceral pain can, Mr. Morley continued, be studied in its purest form in strangulation of a small knuckle of the lower small intestine in a femoral hernia. The pain here occurs in intermittent spasms lasting half a minute or so, and repeated at regularly recurring intervals. If we examine a patient suffering from such a visceral pain, we find that it is felt as a central pain, not on the surface of the abdomen, and quite vaguely localised at or above the umbilicus. There is no superficial hyperalgesia, no deep tenderness, no muscular rigidity. On the other hand, in acute appendicitis, the site of the pain in the right iliac fossa, with its corresponding area of deep abdominal tenderness and reflex muscular rigidity, varies from case to case, with the position which the appendix happens to occupy. The nerves of the sensitive parietal peritoneum must receive the stimulus that gives rise to pain and tenderness in the superficial parts of the abdominal wall, and to the associated reflex muscular rigidity, as a "peritoneo-cutaneous radiation and a peritoneo-muscular reflex." This form of reflex pain is illustrated by stimulation of the phrenic nerve terminals below the diaphragm, when the patient feels the pain in the region of the descending branches of the third, fourth, and fifth cervical nerves, supplying the skin of the supra-acromial region. Infiltration with novocain of this region of the skin either abolishes or greatly modifies the referred pain.

The theory that is commonly held to explain this form of referred pain is that of James Ross (1888): the theory of an irritable focus in the spinal cord. There are, said Mr. Morley, objections to this theory which is completely unsupported by physiological evidence. Recent experimental work on action currents, combined with division of the posterior nerve-roots, seems to offer a more rational explanation of this peritoneo-cutaneous radiation of pain. Barron and Matthews (1934–35) have shown that some 40 per cent. of the posterior root fibres of the spinal nerves can carry centrifugal impulses. Of these a large proportion start in a peripheral sense organ and run to the cord, where one (or more) collaterals pass a longer or shorter distance up or down the cord, leaving it again by a different rootlet from that containing the entrant fibre. It then passes to the periphery, often to a point distant from the original sense organ. These workers found that when a single afferent fibre in a posterior spinal rootlet is stimulated, the impulse emerges through its efferent collaterals in other rootlets with no more delay than can be ascribed to conduction time. This confirms the belief that the efferent fibres referred to are collaterals of the posterior root ganglion cells, and that no synapse is interposed in their course within the central nervous system. Yet despite this absence of synapse the impulses are certainly inhibited or modified within the central nervous system, since discharges enter the cord as a continuous series of impulses and leave it as an intermittent series. These facts appear to give the key to the mystery of peritoneo-cutaneous radiation of pain, without any violation of the law of forward conduction associated with the names of Bell and Magendie. And it would appear probable that, on stimulation of the phrenic nerve, efferent fibres in the posterior root run down to the skin supplied by the third, fourth, and fifth cervical segments, and there liberate a chemical metabolite which stimulates the endings of adjacent pain fibres in the skin. This conception of pain, due to the action of a chemical substance on the sensory nerve-endings, has been made familiar by the work of Sir Thomas Lewis. But it is plain that the nocifensor system of nerves postulated by Lewis (1937) cannot be held responsible, since the hyperalgesia produced in his experiments took many minutes to develop, and persisted many hours, whereas the shoulder pain and its associated hyperalgesia develop instantly when the phrenic nerve is stimulated, and when the stimulus is removed they disappear almost at once. In the pain we are considering the reaction that occurs in the skin is both rapid and reversible.

This study of phrenic nerve pain leads to the conclusion that a similar peritoneo-cutaneous radiation occurs in the superficial nerves of the anterior abdominal wall, when the underlying parietal peritoneum receives a painful stimulus from an inflamed viscus. Infiltration experiments with novocain again confirm this conclusion. From this discussion it seems clear that a more precise definition of referred pain is required than that used at present; it should be held to mean pain felt at a point remote from the seat of stimulation, and we should limit the term

"referred pain" to pain resulting from stimulation of a somatic sensory nerve and referred to a remote part of the distribution of that nerve, or of the segmental sensory distribution with which it is connected. Under this more precise definition of referred pain should be included pain radiating to the testis as a result of renal or ureteric colic, or felt in the end of the urethra from stimulation of the trigone of the bladder. But the interior of the pelvis of the kidney and of the ureter is sensitive to mechanical stimuli, as is the base of the bladder. These organs, are, therefore, innervated with sensory nerves of a different physiological group from the afferent nerves of the gastro-intestinal tract, since they respond to the common type of pain stimulus. It is not surprising, therefore, that they give rise, on stimulation, to both viscero-muscular reflexes and viscero-cutaneous referred pain.

The pain of angina pectoris and of aneurysm of the aortic arch could be abolished by injection of alcohol, or by surgical excision of the upper five thoracic sympathetic ganglia, or by division of the upper five posterior thoracic spinal roots. According to J. C. White (1935) this pain was a viscero-cutaneous reflex, and partly a true visceral pain.

DISCUSSION

Prof. B. A. McSWINEY (London) described experiments in cats which showed that afferent fibres from the splanchnics ascend in the cord on the opposite side, and partly on the same side of entry, and reach the thalamus at least. These experiments illustrated the difference in outlook between the purely clinical mind and that of the physiologist. The physiologist is able to demonstrate by mechanical means the physical transmission of impulses along nerve trunks in a way impossible by clinicians in the human subject.

Dr. E. P. POULTON (London) described a series of experiments in which balloons were swallowed and dilated with air when pain was produced; with further dilation the pain disappeared. He explained this result as follows: there is first a preliminary contraction of the œsophagus which presses on the nerve-endings producing pain. The contraction wave passes and dilation of the œsophagus occurs, removing the pressure from the nerve-endings. Painful impulses are no longer sent along the afferent nerve-fibres to the central nervous system.

Prof. J. R. LEARMONTH (Aberdeen) said there was evidence to show that pain might be due not only to disordered function, but might be produced in the absence of such disorder. He discussed the difficulties of dividing all the afferent fibres coming to the central nervous system from any viscus, notably those from the genito-urinary organs, in human surgery. He suggested the unwisdom of accepting too freely the results obtained from animal experiments often carried out under different conditions. He drew attention to the wide spreading of the afferent nerves; if section was not performed close to the viscus concerned, some of the fibres must necessarily be left untouched and painful impulses continue to be transmitted. Chordotomy had been used for the relief of intractable pain; his experience had been that even at the higher levels of the cord the operation was by no means always successful.

REVIEWS AND NOTICES OF BOOKS

A Text Book on Mental Deficiency

Sixth edition. By A. F. TREDGOLD, M.D., F.R.C.P., F.R.S.E., Lecturer on Mental Deficiency, London University; Consulting Physician to University College Hospital. London: Baillière, Tindall and Cox. 1937. Pp. 556. 25*s*.

FOR this edition the author has not merely revised, he has largely rewritten, the material before him, and the book is now a complete and up-to-date text-book on mental deficiency, covering ætiology, psychology, pathology, diagnosis, treatment and legal procedure, and including also very necessary preliminary sections on normal psychology and the development of the child mind. Dr. Tredgold has not hesitated to alter his views of the psychopathology of mental defect in accordance with developing knowledge. As regards inheritance, however, he adheres to his view that mental defect is due to an impairment of germ developmental potentiality, the theory of "blastophthoria," and refuses to accept the Mendelian theory even in the form in which multiple genes are postulated. Probably on this point he has few followers, but neither side has yet fully proved its case.

Dr. Tredgold's views on "moral defect" have also changed. While he still holds that one of the characteristics of the moral defective is lack of "wisdom," he gives equal prominence to inability to acquire the higher moral and social sentiments. He seems to be more convinced than formerly of the rarity of the condition, though he does not accept the view now held by many psychologists that no one is innately incapable of developing such sentiments, and that therefore there are no moral defectives. It is astonishing that he is not more critical of the legal definition of moral defectives in the M.D. Acts. His distinction between "vicious and criminal aments" and "moral defectives" is just enough. But the definition of the moral defective in the Acts really corresponds to Dr. Tredgold's description of vicious and criminal aments, and it is only by a somewhat laboured argument that he is able to reconcile the discrepancies in classification.

More space is given than in previous editions to certification under the Education Act, a certification which Dr. Tredgold rightly stigmatises as anomalous; but it is questionable whether school medical officers would be wise to accept his advice to limit certification to children suffering from "social" as well as educational defect. Such a policy would delay entrance to a special school until social defect could be safely diagnosed, often quite late in childhood, and in addition would tend to encourage the admission to such schools of many ineducables. The real remedy, as Dr. Tredgold clearly recognises, is the abolition of educational certification and a widening of the portal of special schools to admit a larger group of retarded children. Dr. Tredgold himself insists that social and educational defect do not necessarily coexist. It is possible for mental defect in the social sense to be unrecognised and even unrecognisable in school and to become apparent only in adolescence.

As a text-book the work deserves high praise. It gives a complete survey, valuable to practitioners, to certifying officers both under the Education and M.D. Acts, and to institutional medical officers. Its illustrations are excellent, many of them recent, and the writing has a charm rare in medical text-books.

Operative Surgery

Fourth edition. By J. SHELTON HORSLEY, M.D., LL.D., F.A.C.S., Attending Surgeon, St. Elizabeth's Hospital, Richmond, Va.; and ISAAC A. BIGGER, M.D., Professor of Surgery, Medical College of Virginia, Richmond, Va. London: Henry Kimpton. 1937. Pp. 1385. 63*s.* two vols.

IN the preparation of this fourth edition of his book Dr. Horsley has had the assistance of Prof. Bigger and four of his junior colleagues, and the additional material has necessitated publication in two volumes. It is extraordinary in a work of this bulk to find no guidance in the selection of cases for surgical treatment, no advice about the indications and contra-indications for any particular procedure, and no warning of the risks peculiar to any given operation and how to avoid them. It is in fact a long catalogue of operations, the important steps of which are briefly described and beautifully illustrated with numerous drawings by Miss Helen Lorraine.

The effect of grafting new chapters by specialists on to an old book by a general surgeon has been to emphasise certain subjects which deserve less space and are of less importance than many of the procedures which may still be regarded as general surgery. It must be noted, however, that this new material, though upsetting the balance of the work, does greatly enhance its value, and the numerous references to papers on special subjects facilitate the more detailed study of the recent advances in operative surgery.

There is no doubt that the information which these volumes contain could profitably have been condensed into a much smaller space; the illustrations too might with advantage be pruned of unnecessary ones and those which show obsolete or faulty technique. It is to be hoped also that in future editions consideration of the problems of the general surgeon as well as those of the specialist may be brought up to date.

Skin Diseases in General Practice

Third edition. By H. HALDIN-DAVIS, D.M., M.A. Oxon., F.R.C.P., Consulting Dermatologist to the Royal Free Hospital, &c. London: Humphrey Milford, Oxford University Press. 1937. Pp. 400. 17*s.* 6*d.*

FIRST published in 1913, this manual has proved its utility to a generation of practitioners and still makes an individual appeal. The first five chapters are given to considerations on diseases due to pyogenic cocci, eczema, syphilis, and eruptions of a widespreading character. Chapters 6 to 10 describe dermatoses usually to be found in special areas—e.g., the face, the limbs, the hands and feet, the nails, and the groins and genitals. For teaching purposes this method has certain advantages, and the repetitions it entails, far from being tiresome, serve to impress the memory. The therapeutic measures advised are succinct, practical, and thoroughly up to date. It would have been better, perhaps, if the cross references to these had been directed to the actual page and not only to the chapter in which they occur. The descriptions of modern X ray apparatus and radium treatment are good; they do not assume the reader to be an expert physicist, and they are pleasingly free from confusing formulæ. The real danger of harm to the operator from secondary and scattered X rays might be more strongly emphasised, and methods of protection more clearly defined. Few practitioners realise fully the need of care in this respect. More space might have been given to a discussion of dermatitis due to industrial and occupational causes, and a brief account of the Workmen's Compensation Acts, in the interactions of which most practitioners are concerned, would have been helpful.

Quarterly Journal of Medicine

THE July issue contains the following papers:—

THE LIPOPENIA OF HYPERTHYROIDISM. By Eldon M. Boyd and W. Ford Connell (Queen's University, Kingston, Ontario). Determinations of plasma lipid fractions in 43 cases of hyperthyroidism. Values for neutral fat lie within the normal range; those for total lipid, total fatty acid, ester cholesterol, free cholesterol, and phospholipid lie significantly below it.

THE INFLUENCE OF THE CEREBRO-SPINAL FLUID IN ACROMEGALY ON THE URINARY EXCRETION OF CHLORIDES. By P. Ellinger, Dorothy C. Hare, and S. Levy Simpson (Lister Institute and Royal Free Hospital). An acromegalic woman of 32 drank much more water than she excreted in her urine, and perspired freely. Subcutaneous injection of her cerebro-spinal fluid into rabbits increased their chloride excretion during water diuresis, indicating the presence of pituitary antidiuretic hormone in the C.S.F. Its amount decreased after radiation of the pituitary region.

CHRONIC NON-LEUKÆMIC MYELOSIS. By R. A. Hickling (Charing Cross Hospital). Its features are enlargement of liver and spleen from myeloid metaplasia, normal-sized lymph glands, and the presence of some immature red and white cells in the blood without any great increase in white cells. The author would include under this name adult cases also showing osteosclerosis. The myeloid tissue often contains large numbers of giant cells. Splenectomy, often performed after a wrong diagnosis of splenic anæmia has been made, is frequently fatal. Seven cases are described.

The Fate of the Elements Removed from the Blood Stream during the TREATMENT OF POLYCYTHÆMIA BY ACETYL-PHENYLHYDRAZINE. By R. A. McCance and E. M. Widdowson (King's College Hospital). Detailed metabolic observations were made on one patient. During rapid blood destruction increased excretion of urea, creatinine, and undetermined nitrogen occurred. Less than 0·5 per cent. of the iron contained in the destroyed red cells was excreted, and only 30 per cent. of their nitrogen, 5 per cent. of their potassium, and 30 per cent. of their copper were excreted.

A QUANTITATIVE ESTIMATION OF PANCREATIC ISLET TISSUE. By Robertson F. Ogilvie (Edinburgh). The method is based on measurements of the area of the islets in representative sections of the pancreas, and the number and total weight of the islets in the whole pancreas are calculated. One hundred "normal" pancreases were examined. The infant pancreas is found to contain a relatively greater quantity of islet tissue than the adult.

THE SECOND POSITIVE WAVE OF THE Q R S COMPLEX. By A. Hope Gosse and T. E. Lowe. The authors find it in lead III in 2·2 per cent. of 2045 patients referred to a cardiologist. It occurred as often in normal as in clinically abnormal hearts, and appears to have no diagnostic importance.

PORPHYRINURIA IN PELLAGRA. By W. Beckh, P. Ellinger, and T. D. Spies (Lister Institute; and Lakeside Hospital, Cleveland). Alcoholic pellagrins, like endemic pellagrins, excrete increased amounts of coproporphyrin in their urine; the porphyrin output is variable, but bears a rough relation to the intensity of the skin lesions. The significance of these findings is discussed.

THE ORGANIC MERCURIAL DIURETICS IN THE TREATMENT OF CARDIAC ŒDEMA. By William A. R. Thomson (London Hospital). Observations were made on 66 patients. Salyrgan, neptal, mersalyl, and novurit, given intravenously, all produced average 24-hour urine volumes between 2670 and 3000 c.cm. Intramuscular neptal was slightly less efficient (2190 c.cm.). Novurit suppositories gave an average diuresis of 2360 c.cm. Ammonium chloride, 60 to 90 grains daily for 2–3 days preceding the mercurial diuretic, almost always increased its effect. Digitalis had no appreciable influence on the mercurial diuretic effect.

THE LANCET

LONDON: SATURDAY, AUGUST 7, 1937

MILK

THE Government's policy for milk was announced last week.[1] Its authors hope that it "will provide for the dairying industry a basis for an increasing sale of milk in the liquid market, will secure cheap milk for those classes of consumers to whom it will be of particular value, and will provide for consumers generally a permanent improvement in the cleanliness and purity of the milk-supply." The proposals include the creation of a permanent commission to keep watch on the production, marketing, and consumption of milk, and to give general assistance to the industry and to the Ministers concerned. The arrangement by which the industry receives Exchequer grants for milk used in manufacture is now to be modified by means of a price-insurance plan intended to protect it from the effects of fluctuation in the price of imported butter and cheese. Further administrative reforms relate to improved distribution. More important from the medical standpoint, however, is the group of proposals, which concern "quality" milk. The present bonus of 1*d.* a gallon for accredited milk is borne by the pool funds of the Milk Marketing Board. This 1*d.* is now to be raised to 1¼*d.*, of which the Exchequer will contribute ¾*d.* for each of the first two years, ½*d.* for each of the third and fourth years, and ¼*d.* for the fifth year, the balance each year to come from the pool. Tuberculin-tested milk is no longer to remain outside the Milk Marketing Board's scheme and a special premium is to be paid for such milk sold wholesale. This premium will be 1*d.* a gallon for the first two years (the Exchequer paying ½*d.*) and not less than ¾*d.* for the next three years (the Exchequer paying ¼*d.*). The attested-herd scheme of the Ministry of Agriculture is also encouraged by an increase of the bonus per gallon from 1*d.* to 2*d.* for each of the first two years and of not less than 1¾*d.* in the third (Exchequer contributions 1½*d.* and 1¼*d.*); the rates for the fourth and fifth years will be determined later. It will be noticed that the premiums are at a diminishing rate, "in order to give the necessary momentum to the production of quality milk in Great Britain." In further explanation it is made clear that the producers of tuberculin-tested milk will earn a premium of 2¼*d.* a gallon for the first two years and 2*d.* for the remaining three years, while the producer of accredited milk with an attested herd will earn 3¼*d.* a gallon for the first two years and 3*d.* in the third year. These are substantial bonuses and should do much to stimulate production of the cleaner types of milk.

[1] Milk Policy. Cmd. 5533. H.M. Stationery Office. 1937. 2*d.*

It is the third group of proposals, however, that is of most direct concern to public health authorities and the medical profession. For the Government announces its intention that any local authority shall be able to apply to the Minister of Health or the Secretary of State for Scotland for an order requiring efficient pasteurisation of milk retailed in its area. The power to apply such an order is subject to the condition that it shall not come into operation within two years of its being made, that milk from tuberculin-tested herds and sterilised milk shall be exempt from its scope, and that milk retailed from dairies supplied by a single herd shall be exempt for three years. (Obviously time must be granted for adjustment, but these periods seem unnecessarily long.) In the endeavour to direct more milk into the right channels the scheme for supplying it to school-children is to be continued with minor modifications and arrangements are to be made by which local authorities can obtain it at reduced prices for the use of expectant and nursing mothers and for children under school age. This will enable such authorities to enlarge their present activities.

The problem of milk has hitherto been dealt with piecemeal and by legislative measures of very limited utility. It is refreshing, therefore, to find a balanced and progressive policy put forward. We welcome especially the statement that increased consumption of liquid milk can only be based on public confidence in its cleanliness and purity. This is an argument that we have constantly urged, and it is satisfactory to see not only full recognition of its importance but plans that take it into account. If advantage is taken of the powers now to be offered to local authorities this country will have gone far to put milk in its proper place as a food; and once they are sure that it will not convey disease the medical profession will confidently recommend its wider consumption.

HOLIDAYS WITH PAY

THE only statutory provision for holidays for those employed in industry is contained in the Factory and Workshop Act, **1901.** This Act compels occupiers of factories or workshops to allow as holidays the equivalent of six working days (which may be allocated in half-days) to every woman, child, or young person employed by them. The law does not enforce the payment of wages for such holiday periods. The only change proposed in the present Factories Bill is the removal of the permission to split the holidays into half-days. The vast body of workers are without any legal entitlement to annual holidays, with or without pay. According to the evidence submitted last April to the Committee on Holidays with Pay[1] by Mr. F. W. LEGGETT, principal assistant secretary at the Ministry of Labour, other holidays were allowed, before the late war, in many industries, but only small classes of employees and operatives were paid wages in respect either of

[1] Minutes of Evidence taken before the Committee on Holidays with Pay. First Day. London: H.M. Stationery Office. 1937. 2*s.*

statutory or additional holidays. These exceptions included the railway, public utility, and local government (non-trading) services. After the war the practice spread, so that already in 1920 sixty general and district collective agreements between employers and workpeople were known to exist, a number which had risen to a hundred by 1922. In April last it was estimated that the number of workpeople covered by such agreements was between 1½ and 1¾ millions. Under an agreement between the Engineering and Allied Employers' National Federation and the engineering trade unions, announced on July 27th, a further 600,000 workers will become entitled to a full week's holiday with pay for each year of employment. This is the first instance in this country of paid holidays granted by a major productive industry and is, no doubt, one of the results of its prosperity. In France, Belgium, and the Irish Free State workers, with certain exceptions, are statutorily entitled to this privilege, the relevant legislation in the case of each of these countries having been passed about a year ago. In Belgium and the Irish Free State a continuous period of six working days is allowed after qualification by one year's employment, with a sliding scale of days for shorter service. In France an employee is entitled to six working days for six months' continuous employment and to twelve working days for a year's service. These holiday periods must, as a rule, be continuous and statutory public holidays may not be reckoned in allocating them.

In his presidential address [2] to the annual conference of the Association of Approved Societies on July 2nd, Mr. A. S. COMYNS CARR, K.C., suggested that this movement was of interest and importance to the approved societies. In his view the unfavourable sickness experience that has been revealed in recent years by National Health Insurance records may be partly due to the stress, strain, and worry of modern life of every kind, and particularly of industrial life. Holidays with pay would be some relief of this tension. He would like to see unemployment benefit and holiday benefit closely linked together, and his proposition was that holidays with pay should be statutorily enforced and financed by a contributory insurance system. He understood that the new law in France was defeating its own object by the burden it cast on employers and the consequent unemployment and rise in the cost of living. Mr. COMYNS CARR urged the value of holidays not only as a means of restoring the worker but as a means of spreading employment more widely. He sees them as a contribution towards changing the absurd situation by which most people work too hard while others are not allowed to work at all.

Because improvement in diagnosis and record-keeping is only recent, it is hard to know whether there is among workers any real increase of mental breakdown or of physical disability with a nervous background. The evil effects of rationalising industry and office organisation, with their attendant specialisation and speeding-up, may have been counteracted to some extent by "routing"—control of the direction and flow of raw material. The result of the urge to output without humane control is brilliantly caricatured by CHAPLIN in his film "Modern Times." Obviously, a mere week's holiday is no remedy for such extreme forms of continuous over-pressure. But it would do something to undo the staleness from which we all suffer as the result of doing the same thing constantly and so bring mental recuperation and raise individual efficiency. The workers have, indeed, made their own arrangements in the past, often taking holidays without pay, sometimes financing them through clubs of their own organising. It is also a conspicuous fact that they have learned to devote their spell of leave to less hilarious and unhealthy pursuits than of old. The holiday with pay is inevitable, but in this country it is likely to come rather by agreements than by law, and probably not, in the first instance at least, by adherence to such conventions as the International Labour Office has already drafted on the subject.

[2] *National Insurance Gazette*, July 15th, 1937, p. 433.

ALTERNATIVES TO PROSTATECTOMY

SUPRAPUBIC enucleation of the prostate is a good operation in the sense that it may give complete relief from symptoms and restoration to normal life. Apart from its immediate dangers, however, there are two good reasons for considering other active but less drastic methods of dealing with prostatic enlargement. In the first place, suprapubic prostatectomy, even under the most favourable conditions, means an unpleasant period of convalescence which is badly borne by patients whose heart or kidneys are already damaged; and in this it compares unfavourably with operations by the urethral route. Secondly, if it is true that prostatic enlargement is not a new growth in the ordinary sense of the word, but is a response to hormonic imbalance, it seems reasonable to hope that in early cases injection of an appropriate hormone will cause regression and give permanent relief.

In the July issue of the *British Journal of Surgery* Mr. HUGH LETT reviews the three most popular alternatives to prostatectomy—namely, perurethral resection, treatment with hormones, and Steinach II vasectomy. He concludes that suprapubic prostatectomy is still the operation of choice when the hypertrophy is moderate or large, but he thinks that perurethral resection will have a permanent place in prostatic surgery, its value being most apparent in the treatment of small middle-lobe enlargements, of sclerosis at the bladder neck, and of obstruction following prostatectomy, and in certain cases of carcinoma of the prostate. It can be used where a patient is too old or feeble to survive suprapubic enucleation; but in such patients Mr. LETT holds that preliminary cystostomy should be performed, that the vasa should be ligatured, and that a number of limited resections should be done in preference to removal of a large amount of tissue at one sitting. The recent development of the perurethral operation is due to the introduction

of resection by the cutting current, and though the results have been good in the hands of the expert there are many difficulties and dangers. Hæmorrhage was at first greatly feared, but it has now been largely obviated and serious bleeding is rare. The careful coagulation of each vessel as it is exposed and the preliminary injection of adrenaline into the prostate gland are both helpful. Sepsis is now regarded as a much more serious complication, and one that is much more difficult to avoid. Pus in the urine may be found for months after resection, and urinary symptoms such as frequency and pain may persist indefinitely. The seat of the sepsis is the sloughing tissue left behind after the resection, and the consequence all too often is chronic prostatitis, and possibly chronic vesiculitis. With limited resections there is less sloughing and the urine may become clear when the last slough has been passed; in feeble subjects preliminary vasectomy will prevent epididymitis. Another dangerous result of the operation may be excessive coagulation in the tissues deep to those to which the high-frequency current is applied; rectovesical fistula, peritonitis, pelvic cellulitis, and secondary hæmorrhage are all possible effects of excessive coagulation at the base of the bladder. Mr. LETT also refers to the risk of passing an instrument too large for the calibre of the urethra. The present practice of surgeons in this country and on the Continent who employ this method seems to be to limit the proportion of cases treated by perurethral resection to about a quarter.

A curious fact about the hormonal treatment of prostatic enlargement to which Mr. LETT calls attention is that, whereas castration has been used with success as a means of reducing the size of the prostate, injection of testicular hormone is now one of the favourite methods of treatment. The resolution of this paradox no doubt lies in the separation of testicular secretions, but meanwhile it is believed that symptomatic relief is sometimes obtainable with sufficient doses of extracts of whole testis. The use of testosterone propionate, which has now been synthesised, is being carefully explored, with promising results; it is stated that the most hopeful cases for hormone treatment are the early ones, and those in which the gland is large and adenomatous. About the value of indirect hormone therapy, as exemplified in the Steinach II operation, Mr. LETT is much more dubious. STEINACH'S original operation was vasoligation, but he now advocates ligature of the vasa efferentia as they leave the testis. The purpose is to increase the production of the internal secretion of the testis, and hence the amount of hormone in circulation. Theories have been produced to explain why this operation affects the prostate, but, as Mr. LETT says, until we are convinced that it really does anything, we are not concerned with how it does it. He is prepared to allow that symptomatic relief is obtained in a small proportion of cases, particularly in patients with large adenomatous prostates causing acute retention. But he is not sure that the effect is more than transitory, and he thinks the procedure may be dangerous by delaying prostatectomy.

A HOSPITAL SURVEY

WHILE hospital accommodation in general is still insufficient throughout the country, the internal migration of the population and the evidence of the approaching end of its growth are creating a curious situation in some localities. For instance, London, with about two beds for infectious diseases per 1000 of the population, is losing its people to the outer belt, while the Home Counties have to make new provision in their areas for the incomers. Since the transfer of poor-law functions in 1930 the larger local authorities have felt the urge to enlarge the accommodation in municipal general hospitals. Some coördination of the total provision of beds, both voluntary and rate-supported, in each local government area has been assured by the consultation with voluntary hospital committees enforced by the 1929 Act. Although the terms of this section are vague and there is no obligation upon either local authorities or voluntary hospitals to reach agreement, it may be assumed that the Minister of Health has rarely sanctioned large new projects of counties or municipalities without evidence from such a conference, or from some other source, that there is need for the scheme. The erection of at least one new general hospital, however, has recently been sanctioned within ten miles of a hospital built by another authority so short a time ago that it is still unfinished, and is moreover carrying the heavy expenses of administrative quarters big enough for double its present bed accommodation. Maladministration of this kind should be preventable. Adjustment of the preconceptions of voluntary bodies and local authorities may be reached through permanent coördinating committees like those set up in Manchester and other large towns, but hospitals serve, and should continue to serve, wider areas than those even of the great cities. Little has been done to make collaboration over these wider areas effective. Not only are many local authorities non-coöperative, but the voluntary hospitals are weakened by the lack of such a regional organisation as the Voluntary Hospitals Commission has recently recommended them to establish.

We may well inquire what has been the experience in other English-speaking countries and in this connexion a report just issued by the United Hospital Fund of New York[1] merits careful study. So far only the second volume has appeared, Vol. I, the summary, and Vol. III, a financial survey, being promised at an early date. The magnitude of the work may be gathered from the fact that the part available runs to 1246 pages; the cost of the inquiry and publication has amounted to nearly £30,000. The committee entrusted with the work decided that the hospital problems of New York City, with a population of seven millions, could not be dissociated from those of the rest of the metropolitan area which spreads into three States, New York, New Jersey, and Connecticut. This whole area of 1535 square miles has a combined population of nearly eleven millions,

[1] Report of the Hospital Survey of New York. Vol. II. The United Hospital Fund, New York. 1937.

i.e., rather more than live in London, Essex, Hertfordshire, Kent, Middlesex, and Surrey, of which the area is three times as extensive. Serving the New York metropolitan area there are altogether 329 hospitals, of which 225 are described as general; 43 provide for diseases of the eye, ear, nose and throat, diseases of women and children and orthopædic conditions, with an aggregate total of 48,390 beds. This total does not include beds for acute infectious diseases, tuberculosis and nervous and mental cases; for these 61 hospitals exist with 22,414 beds. Seventy-three general hospitals, with 3395 beds, are described as proprietary, being comparable with a few of the larger private nursing-homes in this country. There are striking differences from British practice in the provision for certain types of case. For instance, rather less than 2400 beds are available for infectious diseases, a rate of 0·22 per 1000 as compared with standards varying from 1 to 2 per 1000 advocated here; the report suggests that this provision is adequate in the light of the present incidence and the existing facilities for home treatment. On the other hand, 80 per cent. of confinements occur in hospital, and while it is recommended that maternity beds be not increased because of the fall in the birth-rate, this degree of hospitalisation is accepted as likely to persist.

The report covers a very wide field, dealing with the characteristics and past and present changes of the population; the nature and ownership of the hospitals; their nursing organisation and their out-patient departments; social service (almoner work); ambulance provision; conditions of employment of non-professional staffs; the needs of chronic cases and convalescents; the medical and nursing care of the sick in their homes; medical services organised by employers, unions, and friendly societies; coördination of all services for the sick; the special problems of maternity, mental disease, tuberculosis, venereal diseases, cancer, heart disease, diabetes, and dental decay. The information furnished on each topic is precise and detailed. The principal conclusions and recommendations occupy 22 pages, and touch upon almost every personal health service except the private practice of medicine. The central point is the establishment in New York City and in each large subdivision throughout the area of a representative and authoritative planning group to review and "pass upon" every major proposal involving capital expenditure for the organised care of the sick. A hospital council was, in fact, set up for New York in October, 1934. It is further recommended that, with the growth of population, voluntary and governmental hospitals should develop side by side, the latter being increased to accommodate the sick poor until their occupancy does not exceed 85 per cent. of the available beds in them. A standard of 4·5 beds in general hospitals per 1000 of the population is suggested; the present proportion falls little short of this standard. At the same time dispensary and domiciliary care should be extended so as to relieve the pressure on in-patient accommodation, these services as far as possible being centred on hospitals. With the same object provision for chronic cases and convalescents should be made. New construction of hospitals of less than 200 beds is deprecated. Detailed proposals are also made for the conduct of the various institutions and services, and for meeting the needs of special types of disease.

The report will be of lasting value to those concerned with the development of organised medicine and nursing not only in New York and the United States but in every civilised country.

ANNOTATIONS

RADIATION AND THE CELL

THE treatment of tumours and other morbid conditions with X and gamma rays is now a well-established part of medical practice. As so often happens in the treatment of disease, the use of a powerful therapeutic agent has been developed by empirical methods of trial and error and has far outgrown any theoretical basis of experimental knowledge about biological effects. Welcome therefore are the attempts made in the last 10 or 15 years to investigate the action of X and gamma rays on living tissues and cells of various kinds along scientific, as distinct from purely therapeutic, lines. This type of research has had grave difficulties to encounter and the fact that a body of knowledge is gradually, if still somewhat uncertainly, emerging is of real importance to medical science. A major contribution by Dr. C. M. Scott has just appeared.[1] His report is divided into two parts. The first gives a reasoned account of available evidence in which the author collates the work of others with the results of his own first-hand experience. The second is a brief statement of Dr. Scott's own experiments upon the exposure of the isolated frog's heart to X and gamma rays and of the eggs of the fly *Calliophora erythrocephala* to X rays under a well-chosen set of conditions.

The key to the report is given by the word quantitative, for it is now almost a commonplace observation that great advances may be expected in any investigation of biological processes and reactions once quantitative and enumerative methods come to be generally applied. A second feature of Dr. Scott's essay is a courageous though objective willingness to sum up the data and to state in definite terms the conclusions to which he has been led. No finality is claimed for any of these dicta; the author quotes Bayliss's remark that a clearly understood and intelligibly stated opinion promotes the progress of science even if it should in the end prove to be wrong. On the physical aspect of the problem, often showing his awareness of possible errors in measurement, the author is definitely against the applicability of the quantum hit theory to explain the characteristic curves of the deaths of cells by irradiation. The data are, he thinks, better explained by the theory of individual variation in the resistance of the cells—a conclusion well supported by his own work on the calliophora eggs. He emphasises the amazing variability (more than 1000-fold) in sensitiveness to X and gamma rays of different types of cells and of

[1] Some Quantitative Aspects of the Biological Action of X and γ Rays. By C. M. Scott. *Spec. Rep. Ser. med. Res. Coun., Lond.* No. 223. H.M. Stat. Office. Pp. 99. 1*s.* 6*d.*

the same tissues at different stages in their development, from which the main fact emerges that embryonic tissues are radio-sensitive and adult tissues are relatively radio-resistant. In respect of the sensitiveness of cells that divide, and the resistance of cells that do not divide, X and gamma rays appear to have an action peculiar to themselves. Basing his conclusions largely on the evidence obtained from the irradiation of the eggs of calliophora, Dr. Scott rejects the view that X and gamma rays have any significant effect upon the respiratory mechanism. By a method of superimposing two types of injury (for example the injury produced by X rays on that produced by asphyxia) he was able to show their independence or their interrelation. Out of this type of experiment he deduces, amongst other things, that the effect of X rays is completely unrelated to the *p*H of the eggs, and that the temperature at the time of the irradiation or during the subsequent incubation has no influence on the lethal action of X rays. He finds, on the other hand, that the lethal action of X rays on calliophora eggs is potentiated by chloroform, ethyl ether, and pentane. Nitrous oxide, however, he says, has no influence at all on the lethal action of the rays, although it produces a delay in the time of hatching of the eggs. He is further led to the view that the primary biological action is independent of the metabolic processes of the living cell and, while insisting on the importance of cells that divide as distinct from cells that do not, he comes to the conclusion that injury produced by radiation is primarily unrelated both to the rate of division and to the metabolic rate of living cells.

Dr. Scott concludes that the action of X and gamma rays is primarily on the nucleus itself and thereby on the cell processes that control growth. But, in spite of the good argument that X and gamma rays being powerful agents in the production of mutations are therefore acting directly on the nucleus, his fellow biologists will still remain doubtful whether the autonomy that he ascribes to the nucleus in the life of the cell is justified. Whether the effect is, as Dr. Scott concludes, on the nucleus itself or on the relation between the nucleus and the cell as a whole, it remains clear that changes in cell division are the emerging phenomena that can be most readily studied. There is also general agreement that these are the characteristic changes produced by X and gamma radiation. The author quotes the results of workers who have used tissue cultures, including the valuable work of the Strangeways Research Laboratory on the graded effects ranging from transitory reversible injuries to irreversible ones of various intensity. In the most recent paper[2] from this laboratory K. Tansley, F. G. Spear, and A. Glücksmann describe the effect of gamma rays on cell division in the developing rat retina. Here the in-vivo radiation of the growing retina shows the distortion of the normal mitotic ratio between the frequency of occurrence of prophase, metaphase, and telophase. These authors also find that the undifferentiated cells of the retina may degenerate under the influence of quite small doses of gamma radiation, owing to an effect upon cells which are about to divide but which are injured in such a way that they are unfitted for the ordeal of mitosis. This distortion of the mitotic ratio is a very delicate tool in the analysis of what might be called cell-division welfare. The results show the reversible temporary effects and the irreversible degenerative effects in relation to each other and are in agreement with the results already obtained by the exposure in vitro of tissue cultures to gamma irradiation.

On the influence of the time-intensity factor on the biological result of radiations it may be well to quote Dr. Scott's own words :—

1. When the administration of a quantity of radiation is spread over a long time, either by giving divided doses at intervals or by using a beam of low intensity, the biological effect is less than the effect of the same total quantity of radiation administered within a short time.

2. As the time over which the administration of the radiation is shortened there comes a point beyond which the time-intensity factor ceases to influence the biological result.

3. The time-intensity factor can be most simply explained in terms of the recovery process of cells and in the same terms the success of the modern methods of treating tumours can also be explained most simply.

And in this connexion Dr. Scott calls attention to the practical importance and value of future research on the processes by which cells recover from the effects of radiations.

[2] *Brit. J. Ophthal.* June, 1937, p. 273.

ILEITIS

A CLAIM to priority in the description of a clinical entity has sometimes been the most potent stimulus to an inquiry into its natural history. The medical press has during the last two years devoted considerable space to the description, clinical and pathological, of non-specific ileitis. Many papers have been written, each summarising its predecessors, and almost all have referred to the early and striking contributions of Crohn and his collaborators. Jackson[1] has now given a magnificent bibliography of 39 contributions. Earlier work has come to light, dating back to a clinical description in 1806[2] which has established a posthumous claim to priority on behalf of C. Combe and W. Saunders of London.

The nomenclature has been confused. Though this benign inflammatory disease usually limits itself to the terminal two feet of the ileum, the same pathological process may affect any part of the small intestine, including the large bowel. Ileitis cannot be described accurately as "regional" when some twelve feet of intestine are affected by the primary ulcerative and cicatricial process. Nor can "Crohn's disease" properly define the condition any longer, since the majority of cases recorded have stopped short of the fistula-formation and gross changes originally described by him. He has himself grouped together on the one hand types that present the picture of acute appendicitis, and on the other those that closely resemble chronic ulcerative colitis. Perhaps the most striking intermediate cases are those with gross pathological changes in the intestine—thickening, ulceration, and almost complete stenosis—whose unadorned clinical picture is one of mild dyspepsia. Radiology has proved misleading, as it has done in many cases of appendicular disease.

Certain issues arise from the "rediscovery" of this serious enterological condition. Perhaps the warning is mainly to the operating surgeon. Modern surgery already runs the risk of lay condemnation for its activity in the tonsillar and right iliac fossæ, and it behoves every surgeon to keep in mind this benign but nevertheless progressive disease—non-specific cicatrising ileitis—when an innocuous appendix vermiformis has been delivered through a neat but inadequate incision. The radiologist who seeks to diagnose appendicular disease should remain

[1] Jackson, A. S., *Surg. Gynec. Obstet.* July, 1937, p. 10.
[2] Goldstein, H. I., *Lancet*, June 26th, p. 1547.

reticent, and the physician who feels a "thickened cæcum" in a dyspeptic patient should look upon this as a swelling in the right lower quadrant that may prove to be an organic cause of what he would otherwise label as functional dyspepsia. What the caustic surgeon frequently regards as a "physician's appendix" may prove to be, not a red herring, but matted ileum, and the old verdict of "just one or two glands in the mesentery" may come to be less often used. Jackson has done well to condemn the popular button-hole abdominal exploration.

DELAYING THE ACTION OF VASOPRESSIN

THE pressor-antidiuretic hormone of the pituitary has been known for many years, and it is disappointing that a principle so potent physiologically should have found so little employment in practical therapeutics. Apart from diabetes insipidus, which is fortunately rare, there are no conditions in which vasopressin may be said to be indispensable. These limitations are probably due, at least partly, to the brevity of the responses which injections of vasopressin elicit. This is particularly true of the pressor response, which, though intense, lasts only for minutes. The antidiuretic effect is more enduring and diabetes insipidus can often be held in check by injections or insufflations of pituitary extracts given twice daily. This compares favourably with the insulin treatment of diabetes mellitus, but even here there is room for improvement. Hence the attempts of Prof. Dodds and his colleagues, reported elsewhere in this issue, to delay the action of vasopressin by addition of zinc salts are of no small interest. The increase of the antidiuretic response which they have obtained in animals is very considerable, and if no unforeseen difficulties are encountered in applying these findings to clinical ends it seems probable that the treatment of diabetes insipidus may be improved, and at least possible that new uses may be found for vasopressin.

DIRECT IRRADIATION OF GLIOMAS

EXPERIENCE has shown that malignant gliomas cannot be eradicated surgically. Faced with a cerebral tumour such as a medulloblastoma or spongioblastoma multiforme, the surgeon usually limits himself to a palliative operation in order to preserve vision and relieve headaches. Such highly malignant tumours are usually remarkably radiosensitive, and dramatic recovery may follow energetic treatment with radium or deep X rays. This recovery however lasts for a disappointingly short time, and subsequent irradiations afford progressively less relief.

It is clear that the rays have a destructive effect upon the tumour, but the sensitiveness of the skin has always imposed strict limits upon this form of treatment. It is to overcome this serious handicap that irradiation through an opening in the skull has been adopted in certain clinics. The portion of the brain affected is exposed at operation, and after the surrounding tissues have been suitably draped and protected with lead foil, the X ray apparatus is adjusted over the wound so that irradiation may be applied direct to the exposed brain and tumour, after which the wound is closed in the usual way. The "direct" method has been used by Sherwood Moore [1] elsewhere in the body, with hopeful results, and with Sachs and Furlow [2] he is now able to record some cases of brain tumour thus treated. Though no claims are made for the success of the treatment, it is emphasised that removal of intervening tissues allows of much larger doses being given than has previously been possible. Indeed, the limiting influence of the overlying skin having been abolished, there is danger that the radiation may be given in doses sufficiently great to destroy normal brain and even the skin, mucous membrane, and bone of the opposite side of the head. Since this method of treatment is as yet in the experimental stage, its intensive study is necessary before routine procedures can be adopted. An excellent example in this respect has been set by Elsberg, Davidoff, and Dyke,[3] who have erected in their operating theatre a powerful and heavily protected X ray apparatus with mobile side-screens for protection. A number of animals have been subjected to graduated doses of rays so as to determine the maximum exposure that the brain and spinal cord will tolerate. In animals in which this dose was exceeded neurological symptoms developed which were subsequently proved to be due to softening of the nervous tissue. In some of the animals ulceration of the mucous membrane of the pharynx and necrosis of the base of the skull resulted from the heaviest doses. Guided by these experiments, Elsberg, Davidoff, and Dyke have treated a number of patients suffering from inoperable brain tumours, but the time has not yet come when the results obtained with the new technique can usefully be summarised.

[1] Moore, S., *Amer. J. Roentgenol.* 1936, **36**, 969.
[2] Sachs, E., Moore, S., and Furlow, L. T., *Ann. Surg.* May, 1937, p. 658.

TRAFFIC IN DANGEROUS DRUGS

THE advisory committee of the League of Nations on the traffic in opium and other dangerous drugs, during its recent sessions at Geneva, concerned itself with many aspects of the international control of drugs of addiction. The figures furnished for the legitimate world manufacture of morphine, heroin, and cocaine show considerable reductions during the last seven years. Thus while in 1929 the amounts of morphine, heroin, and cocaine returned as having been manufactured were 57·85 tons, 3·65 tons, and 6·43 tons respectively, the corresponding figures for 1935 were 30·91 tons, 0·67 tons, and 3·97 tons. These last amounts are held to approximate to the world's legitimate needs of these drugs. Fifty-four sovereign States are now parties to the Geneva Convention of 1925 and 61 to the Limitation Convention of 1931. The position is less satisfactory as regards the 1936 convention for the suppression of illicit traffic, for while 32 States have attached their signatures to it no ratifications have yet been deposited.

The clandestine manufacture and illicit traffic in narcotics in the Far East is "increasingly serious, especially in the Chinese provinces under Japanese influence." According to the representative of the United States in these provinces "the systematic increase of poppy cultivation and of the sale of opium had, for the past year, attained alarming proportions." Some 40 to 50 tons of Iranian opium are stated to be annually imported into these provinces and Manchuria for the production of morphine and heroin which are then consigned to North America, Egypt, and Europe. It is alleged that in Jehol and Manchuria the administration encourage addiction as a source of revenue. Japanese newspapers have stated that in 1936 about 6000 persons died of drug addiction in the chief towns of Manchuria. The Manchukuo Government estimate an increase of 25 per cent. of the sales for this year over those for 1936, and apparently have no intention of arresting the traffic in heroin and morphine. The advisory committee have appealed to

[3] Elsberg, C. A., Davidoff, L. M., and Dyke, C. D., *Bull. Neurol. Inst., N.Y.* January, 1937, p. 19.

the Chinese and Japanese Governments to coöperate in the campaign against the manufacture of, and illicit traffic in, narcotic drugs. Not much progress appears to have been made towards the conference on limitation of the production of raw opium which was authorised by the Council and Assembly of the League some years ago. "The committee was unanimous in thinking that the final success of the conference could only be assured by painstaking and methodical preparatory work carried on without undue haste" and accordingly resolved itself into a "preparatory committee" of which a session will be held in May, 1938.

SWAHILI MEDICINE

A CORRESPONDENT, Mr. W. Hichens, late of the Civil Administration of East Africa, has had the good fortune to come into possession of a specimen of medical literature which he believes to be the only medical writing of the Swahili people that has ever reached European hands. He tells us that such writings have long been talked of as current among the native medical practitioners, but are always jealously guarded and handed down among the natives alone. The manuscript which has come into his possession is written in the Swahili tongue and was dictated in or about 1885 by Maalim Sikujua to his son, Maalim Sikujua the younger, and added to by the son and by another learned native, Ahmad bin Muhammad bin Ahmad. The elder Maalim Sikujua was, we are told, a man of considerable eminence who lived through the greater part of the nineteenth century, and owed his renown not only to his medical learning but also to his skill as a poet. His son followed in his father's footsteps and was distinguished both as a poet and a doctor, and Ahmad bin Muhammad (1810–89) was a sage learned in the law and of aristocratic descent, a scion of the royal family which ruled the district round Mombasa for many centuries until the coming of the Europeans. The people of this district are a dark-skinned race of mixed origin, the original Bantu stock having been intermarried for many generations with Persians and Arabs. In the 600 years between 1200 and 1800 this race attained a high degree of culture and refinement. Their ports of Mombasa, Malindi, and later Zanzibar were the chief markets for the slave, gold, ivory, and spice trade between the Farther East and Africa, and their prosperity, their learning, and their culture generally they owed chiefly to the Persian and Arabian elements which entered the coast early in the tenth century of our era. The medical lore and tradition of the Swahili people thus has a dual origin; the native traditional practice was added to and no doubt largely supplanted by Arab learning and Persian experience and tradition, and as we know Arab medicine was considerably indebted to Greek medicine. Mr. Hichens therefore considers that the manuscript of Maalim Sikujua represents the traditional medical learning current during the whole of this long period until the arrival of the Europeans in the nineteenth century; moreover, that this body of traditional lore still keeps a place side by side with European skill. Many of the drugs recommended are closely akin to those which figure in the European pharmacopœias, and though there are traces of "medical magic" and of remedies which owe their virtue mainly to the power of superstition, still there is not a little that is of proved value. Mr. Hichens suggests the possibility that some of the native drugs which have hitherto been but little studied may prove to be useful additions to European pharmacology.

Mr. Hichens has translated the manuscript and added many footnotes dealing with the nature of the remedies, and occasionally with the native herb-lore and folk-medicine, which are full of interesting information. The manuscript deals with a wide range of subjects among which are included leprosy, elephantiasis, syphilis, sterility and impotence, stillbirth, dropsy, and hæmorrhoids. There are sections dealing with such common disorders as suppuration in the ear and constipation, and there is a chapter on "demon-possession." It is often difficult to recognise from the somewhat abbreviated descriptions the exact nature of the complaint for which the prescriptions were supplied. But in several instances Maalim Sikujua recommends incision for suppuration to be followed by hot fomentations of various native drugs. Calumba root is a drug which he praises but adds that it is so common and well known a remedy that patients often despise it. Human nature obviously does not change under another sky. Purgatives of course figure largely; indeed purgation is to be the preliminary to all drugging. "In every coughing ailment and congestion it is necessary to give a purgative first. When you have given a purgative and know that his bowels are clean, then is the time to give him medicine." The sections on leprosy and elephantiasis distinguish between the "true" and "false" diseases, but do not give any very clear indication of the nature of the distinction; it would appear that the author wrote for instructed hearers, and was so able to devote most of his space to the lists of approved remedies. Mr. Hichens has not given us any excerpt on the treatment of fevers: it would be interesting to learn if any of the Swahili remedies have any great reputation among the natives and what they are. He does mention briefly in his introductory remarks as an instance of "magic medicine" the treatment of dengue by means of the "stolen rope": the rope *must* be stolen but he does not tell us how or where it is applied. A careful comparison of this Swahili treatise with some of the earlier Arab medical works should be of great interest.

ABLATION OF TONSILS BY SHORT-WAVE DIATHERMY

IN two short papers[1] Frühwald and Stieböck describe ablation of the tonsils by means of short-wave diathermy coagulation, respectively from the clinical and technical aspects. A current of 1½ kilowatts is used, delivering undamped vibrations of a frequency of about 50 millions per second, with a wave-length of 4–8 metres. The method is unipolar, for a passive electrode is not employed. The electrode, carried by a pistol-shaped handle provided with a switch, is held at a distance of a few millimetres from the surface of the tonsil and the current switched on for a few seconds until a greyish-white area is produced. The tonsils are treated at alternate weekly sittings, the entire process occupying several weeks. Frühwald and Stieböck claim that the current is more even and more easily regulated than that of the ordinary diathermy coagulation with a wave-length of 300 metres, and that, after two or three applications of 20 per cent. cocaine, the patient feels only a slight pricking or burning sensation; but there seems to be a similar after-soreness, for the diet is restricted to slops for a couple of days after treatment. Nearly 200 cases have been treated by this method which has been highly satisfactory in the

[1] Frühwald, V., and Stieböck, L. H., *Wein. klin. Wschr.* July 9th, 1937, pp. 1038 and 1039.

authors' hands. Quite rightly they do not recommend it in place of surgical enucleation but reserve it for patients for whom this is undesirable. They rather spoil their case, however, by ascribing to the ordinary diathermy defects that are not unavoidable, such as uneven sparking, a clattering noise from the machine, and unpleasant sensations, and even burning, at the site of the indifferent electrode. Diathermy has a well-established place in the treatment of unhealthy tonsils, and the use of a short-wave machine has possible advantages that deserve trial.

A MALEVOLENT SEA-ANEMONE

IN England seaside bathers run more risks from broken bottles than from sea-anemones or even their cousins the jelly-fish. A sharp sting from one of the latter may, however, occasionally remind us that this family is supplied with a system of "thread-cells," each of which contains what is in effect a poisoned harpoon with a spring release. On less friendly coasts sea-anemones are the cause of a good deal of minor discomfort and of some more serious lesions, the natives who dive for sponges being especial sufferers, and it seems that one particular type, the "hellenopolyp," has acquired an evil reputation on the coast of Greece. The lesions produced by this hellenopolyp were described not long ago to the Academy of Medicine in Paris.[1] The immediate result of a sting is local erythema and a crop of vesicles, with a sharp sensation of burning and itching, sometimes accompanied by a rigor and rarely by nausea and vomiting. The burning and itching last only a few hours and the lesions always disappear without treatment in three or four days. Experimentally it was found that touching a rabbit's conjunctiva with the tentacles of the hellenopolyp produces severe inflammation within a few seconds, but that this clears up, as long as there is no secondary infection, in about a week. Typical lesions were produced on volunteer students by stroking their skin with the tentacles, and here again the erythema appeared extraordinarily rapidly, its severity depending largely upon the size of the sea-anemone used. Macerated sea-anemone had no effect when rubbed into unbroken skin or when applied to a small incision, and it is thus clear that the toxin injected by the harpoons of the thread-cells is the cause of the skin reaction. Various local applications—ammonia, hydrogen peroxide, spirit, olive oil, and vinegar—were tried on experimental lesions with a view to lessening the local discomfort, and of these vinegar was found to be much the most successful. Probably it is also the soundest first-aid application for stings from jelly-fish.

ANTERIOR PITUITARY THERAPY IN CHILDREN

BELIEVING that many clinicians are still unduly sceptical about the value of anterior pituitary therapy, Jacobsen and Cramer [2] record their results with ten children, six girls and four boys, treated for dwarfism, infantilism, hypogonadism, and certain types of obesity. Dry thyroid, given in conjunction with anterior pituitary extract, was found to bring more rapid improvement than either anterior pituitary or thyroid given separately. Careful investigations, including blood and blood-chemistry examinations where indicated, basal metabolism determinations, radiography of bones and other special examinations as seemed necessary, were carried out in each case. Attempts were made to compare the effects of periods of treatment with control periods when no treatment was given. Use of more than one endocrine extract was avoided as far as possible, except where there was obvious deficiency of both pituitary and thyroid, in which cases, after making certain of the potency of the preparations and observing the effect of each singly, both were given. In all ten cases the results of treatment were held to be strikingly successful. A boy, aged 11, with hypopituitarism was treated for six months twice weekly with 1 c.cm. injections of an anterior pituitary extract (Antuitrin). No thyroid was given, nor was the diet curtailed. During the period of treatment he gained 1½ inches in height, lost 26 pounds in weight, and became more masculine in manner. Seen three years after stopping treatment he was still quite normal. A girl of 13, who had grown slowly since the age of 7 and who was not maturing normally, was observed for seven months without treatment. During this time her height did not increase. She was given, daily for seven months, 6 grains of anterior pituitary by mouth, during which time she grew 2 inches. For a further nine months she was given 2 grains of thyroid daily in addition to the pituitary. She was now 15½ and during the next four months was given 25 injections of anterior pituitary. Menstruation not having started, extract of pregnancy urine was then added. Two weeks later she began to menstruate and has continued in normal rhythm ever since. During the two years under treatment she grew 5 inches and the secondary sex characteristics developed normally. Equally satisfactory was the mental and emotional response to treatment. Thus an inhibited boy became a class-leader and a bookish girl became interested in outdoor sports. Whilst making due allowance for parental optimism, the writers are sure that, with the physical approach to normal in these cases, a very real change in mental outlook and behaviour follows.

[1] *Bull. Acad. Méd. Paris*, 1937, **117**, 203.
[2] Jacobsen, A. W., and Cramer, A. J., *J. Amer. med. Ass.* July 10th, 1937, p. 101.

THE LANCET 100 YEARS AGO

August 5th, 1837, *p.* 699.

DEATH BY FALLING FROM THE CLOUDS.

THE following is an account of the post-mortem examination of the body of Mr. Robert Cocking, aged sixty-one, who fell with a suicidal machine called a *parachute*, from the cord of a balloon which ascended from Vauxhall Gardens, on the 24th of July, 1837. The height which the balloon had reached when the parachute commenced its descent, is stated to have been 5000 feet. The instrument of death was simply a canvas toy, constructed in ignorance, and used with the hardihood which might distinguish an unfortunate being who contemplated his own destruction by extraordinary and wonder-exciting means,—an end which, without the motive, was more effectually attained, by the crushing of the parachute in the air as it dropped:—(*The report of the post mortem findings is then given, showing multiple fractures of the ribs, clavicle, vertebræ and of the pelvis, and the account continues as follows.*)

"Mr. Finch, and the other surgeons at the inquest, agreed in opinion as to the cause of the deceased's death, namely, the injuries he received in the concussion by the fall on the earth. The spinal marrow was likewise very greatly damaged. Mr. Finch also was of opinion, from the nature of some of the injuries, that the deceased had fallen on his feet. . . ."

The Jury returned a verdict to this effect:—"We find that the deceased, Robert Cocking, came to his death casually, and by misfortune, in consequence of severe injuries received by a fall out of a parachute of his own invention and contrivance, which had been appended to a balloon; and we further find that the parachute did move to his death, and therefore that such parachute ought to become a deodand, and forfeited to the Queen."

SPECIAL ARTICLES

PSYCHOTHERAPY IN THE OBSERVATION WARD *

BY C. M. BARKER, B.Chir. Camb.

OBSERVATION wards are wards attached to public hospitals—i.e., those supported by the rates—where people are sent whose mental condition is thought to be doubtful. Such persons are usually detained as patients only for a definitely limited period, about two weeks, and are then discharged or transferred to a mental hospital.

Up to a few years ago, and indeed still in many parts of England and even a few districts of London, the observation wards were merely clearing-houses attached to poor-law hospitals. They were without trained personnel or proper facilities for observation and treatment. A general practitioner was called in to see the patients and they were either deemed insane and sent to a mental hospital or were considered sane enough to be discharged.

In those days each board of guardians in London had its observation ward attached to the local infirmary. Since the London County Council has taken over the poor-law hospitals in their area the observation wards have been centralised, the smaller ones being closed down and absorbed by larger units. Each of these units serves a large section of the metropolitan area. For example, the City of London Institution, Bow-road, receives patients from an area extending from Hampstead and Highgate in the north to the River Thames in the south, and includes the City of London. The patients are of various types and circumstances and come from all classes of the community, although of course the poorer classes predominate.

A large number are admitted via the police, with a history of, say:

Found wandering and is mentally confused and lost.

Attempted to jump off London Bridge.

Walked into police station and complained that the neighbours were reading her thoughts with a television machine.

Came up to policeman in Threadneedle-street and said he did not know who he was, what he was, where he came from, or where he was going.

Arrived at Liverpool-street Station without a ticket; when asked for one replied that for him a ticket was unnecessary as his soul-mate paid for him.

The members of another large group come directly from their homes, their private doctor having obtained an admission order from the public assistance officer; or a relative or neighbour may have notified the public assistance officer who himself ordered the patient into the observation ward. Still another group will have come from the general hospitals—a large voluntary hospital or a London County Council general hospital. The accompanying letter may say, "The patient has become mentally confused and difficult to manage."

The mental illness is of every kind and degree—from a mild neurotic state to an acute mania, from the earliest onset of a mild mental disturbance or emotional upset (e.g., a highly strung person overwhelmed for the time being by difficult circumstances) to well-established insanity.

It had always seemed to me that the observation wards, instead of being used merely for preliminary diagnosis and as clearing-houses prior to disposal, might become centres for psychotherapy and indirectly educational centres for the general public in matters of mental health. Five years' experience (1929–35) as a medical officer in observation wards which dealt with about 600 cases a year confirmed me in the belief that this was not an idle phantasy but something which could be translated into actual practice. Even though special circumstances limit the amount that can be accomplished, it is nevertheless necessary to have these aims clearly defined, if the observation ward is to develop along the lines indicated by its unique position in the mental health service of the community.

It is not my purpose to describe the workings of an observation ward but to sketch briefly some of the opportunities I found there for psychotherapy.

THE ARRIVAL

We will commence with the arrival of the patient. Here at the beginning is a situation which often requires considerable psychological judgment. Not infrequently an otherwise quiet patient becomes resistive and violent at the moment of entry, and we find that the relatives have thought it necessary to deceive him as to his destination so that he would accompany them quietly. He arrives, not as he expected at the convalescent home, the post office, or (as in one case) the night-club, but at a place which savours suspiciously of the unknown and confirms his idea that his relatives are trying "to put him away." Or the newly admitted patient may protest, "*I* am not mad; all *these* people are mad," and this may be true.

It is surprising how often in these difficult situations the alarm or distress of the patient can be allayed by the medical officer establishing an appropriate relationship with him, so that he feels that he need no longer meet these terrors alone, but in fact has the person in authority standing with him. He feels "accepted," and that sense of isolation which is so often a part of the burden of the patient is relieved.

This is the critical time in relation to the family as well. The relatives often arrive at the hospital in a state of greater agitation than the patient. Upon more than one occasion on the arrival of the family party at the hospital door I have mistaken another member of the family for the patient.

It is essential to secure the family's coöperation from the start. A relative offended inadvertently on the doorstep may refuse to coöperate and later may even actively interfere with the treatment, his negative or even hostile attitude being conveyed to the patient. It is important to remember that usually this is the first time they have been in a mental ward and know nothing of its procedure. Added to this they may be exhausted and irritable from days, weeks, or even months of a heroic struggle to keep the son, wife, or daughter from being sent away to the "mad-house," there, as they believe, to be "put away for the rest of his life."

This is no exaggeration. Their idea of a mental hospital is usually that of a lunatic asylum such as existed a hundred years ago. Their imagination has been fed by lurid tales handed down from grandparents and parents, and kept alive by an occasional lurid story in the sensational press. The terrified exclamation, "If I let my boy go to the mad-house they will keep him there for life," is not an uncommon

* Based on a paper read before the Analytical Psychology Club.

one. "I know I am signing his death warrant, but I have done all I can to keep him at home," said one mother when signing the application form for admission of her son to a mental hospital.

These generations-old, and at one time only too well-founded, prejudices are very difficult to eradicate. But to my mind it is of extreme importance to correct such ideas both in the minds of patients and relatives, and through them the general public. It takes time when one feels it can ill be spared and patience which seems unnatural unless one appreciates the reasons for the hostility and stubbornness.

They need to learn that mental illness is an illness just as much as scarlet fever or tuberculosis; that each requires treatment away from home in a special hospital; that each requires that it be "certified" (that terrible word) that the patient is suffering from the illness which the special hospital treats; and above all, that in each the aim of the hospital is to get the patient well in the shortest possible space of time and so send him home and make room for one more on their long waiting-list.

PSYCHOTHERAPY FOR THE RELATIVES

Every patient is to some degree identified with the members of his immediate family and they with him. For practical purposes therefore I learned to look upon the family as extensions of the patient and take the time to listen to their problems and talk with them about them. This one does of course not only at the time the patient is admitted but also as necessary from time to time throughout the treatment. Often personal problems which directly influence the patient's illness come to light and are dealt with. Sometimes indeed, though the patient himself is at the time too deeply engulfed by the illness to be accessible to psychotherapy, one finds a relative who is on the edge of a nervous breakdown and in urgent need of treatment. In such a case I think it lies within the province of the medical officer to give what help he can, or is able to find time for, according to the urgency, even though the relative is not officially a patient.

Occasionally a relative would ask for permission to attend as an out-patient, or an out-patient would bring a relative in for consultation. Sometimes it seemed advisable to keep in touch with an entire family. One such case is that of Mrs. W. B. whose husband was once a patient and who later had disappeared from home and had not been heard of since. There were two bright boys five and eight years old. The psychiatric social worker kept in touch with the family and both the wife and children were seen by me occasionally. Our object was to lessen the feeling of insecurity and incompleteness which threatened at one time seriously to involve the whole family, because of the suspense and uncertainty about the father.

I referred above to the necessity for securing the relatives' coöperation in treating the patient. Often the lack of it is due to ignorance. Sometimes changing the attitude of the family towards the patient and his illness is a more difficult problem of education than that of the patient himself. In the case of R. T., a young man in a state of almost complete dissociation, the parents alternately wept over him and urged him to "pull himself together," while a brother who was a policeman gave more drastic advice, even threatening to "beat sense into" him. It is easy to imagine the difficult time this patient must have had on his return from the mental hospital.

At the other extreme we find the insight and coöperation of the husband of Mrs. S. P. whose history I will recount later. He himself was on the verge of a nervous breakdown and suffered intensely from his wife's behaviour during her illness. However he worked with me on his problems concurrently with his wife's treatment and thus was able to wait more or less patiently for the favourable development which ultimately took place in her.

The handling of the relatives often requires as much psychological insight and skill as the treatment of the patient. One of my early failures in this connexion was with the husband of Mrs. E. T. The patient recovered sufficiently to be discharged after a few days but her condition demanded intensive psychotherapy over many months. Insufficient contact had been established with her husband during the acute stage of her illness when he was thoroughly alarmed about her condition. After she returned home he became antagonistic to the idea of further treatment. For a time this interfered seriously with her progress, but fortunately I was able later to gain his coöperation, and with this there was an immediate improvement in the patient.

There is no need for me to emphasise further the importance of including the family in one's consideration of the patient. But before I leave them altogether I must say that always at the back of my mind there was the thought that it is through relatives and others associated with the patient that erroneous ideas concerning mental hospitals can be corrected; and that perhaps in time a new attitude will spread to the general public and that they will have some appreciation of the hospital facilities available, and the value of early recognition and treatment of mental illness.

SOCIAL BACKGROUND AND AFTER-CARE

Now to get back to the patient. It was customary for the psychiatric social worker to visit his home and place of work and obtain a complete social history. Such a history is quite invaluable, for it gives the medical officer the background for his picture of the case. His task is to bring together all the relevant data from the social worker, from the story told by the relatives, from the patient's own account, from his and the nurses' observation of the patient, and from his interpretation of the dream and phantasy material disclosed to him by the patient. He must then decide what is the best line of procedure in this particular case—whether the patient should be sent to a mental hospital or to a general ward, or be discharged home; and if he is to go home whether he should have intensive psychotherapy as an out-patient.

Approximately half the cases which come into an observation ward are transferred for treatment to mental hospitals. Of the remainder a small number go to general wards, but the majority are discharged in care of their relatives.

After he leaves the observation ward or the mental hospital the patient still has to face the problem which caused his admission, and the important task is to prevent a relapse by helping him to deal with the factors that precipitated his breakdown. As is well known, a nervous breakdown is not entirely a negative happening. It is a great revealer of the extent of the distortion of the individual from his natural pattern, and it is a great opportunity as it gives him an incentive to correct that distortion, and to develop a way of life more in harmony with his distinctive nature. With this in mind it was my practice to ask each patient at the time of discharge to let me know from time to time how he was getting on, and I invited him to write or telephone for an

appointment and come in to see me if he thought I could be of help to him. If he seemed suitable for intensive psychotherapy he came up regularly for treatment as often as his case demanded (or as often as my time would allow), but in most cases what one might call psychological supervision was all that was possible or advisable.

An example of such a case is that of Mrs. S. P. whose husband I referred to above. She was a middle-aged woman admitted from a general hospital with amnesia. She had been married ten days before her attack, and although she quickly regained her memory she had no desire to go back to her husband. However she was finally discharged to his care and advised to come up as an out-patient. A good relationship had been established with the husband, and he wrote for an appointment whenever the situation became too difficult for him. As they lived some distance from London their visits were infrequent but extending over a period of a year and a half.

For many months there was little progress. Indeed at times there was danger of both being engulfed in the mutual situation. The husband was himself near breaking-point and required as much psychotherapy as the wife. After some time the wife disclosed tragic experiences in her childhood and adolescence which had led to a previous attack of mental illness. Apparently her recent marriage had released the repressed fear connected with these earlier experiences and a large part of her was frozen.

Her fundamental improvement started about this time, nearly a year after the beginning of treatment. She began to make a garden and to redecorate their house; her sexual relation to her husband became satisfactory and she wished to have a child. A few months later the husband wrote that she was completely well and that they were very happy.

Another case may be cited where intensive psychotherapy was used over a considerable period of time.

Miss M. A., a Jewish girl of 20, was admitted from a general hospital where she had been taken after collapsing in the street. She had symptoms of choking, difficulty in swallowing, involuntary jerking movements, and anæsthesia over one shoulder. Her mother said that she had had much treatment at various hospitals and clinics for nervous illness. She would improve in hospital but regress as soon as she came home. Her hysterical symptoms cleared up in a few days and she was discharged home but advised to attend as an out-patient.

She looked and acted like a spoiled child and converted every emotional difficulty into a physical symptom. She was unable to keep work longer than a few days and her life was punctuated by hysterical outbursts. She had been attending for six months before any definite positive movement took place in her. Then she had a dream of an old school-teacher, a woman she had admired but behaved badly towards. She was encouraged to look her up. Eleven years had elapsed and it was a great effort to trace her, and a greater one to meet her. However, she did it. This made a nucleus of positive achievement, and from this time her progress, though slow and irregular, continued. She obtained work in the office of a large firm, and there her responsibilities were steadily increased and her salary raised. She became keenly interested in her work. At the same time her childish clinging to family relationship was replaced by independent friendships in the outside world with their attendant responsibilities. The course of a love affair or two failed to run smoothly, but she faced up to the difficulties in adult fashion.

For a long time she had recurrent hysterical symptoms, but she learned to recognise them quickly as such, to search for their source, and to work at the problems involved. The change in her physical appearance was as marked as the change in her behaviour, the expression of petulant childish restiveness gradually giving place to one which was mature and attractive.

When a patient went on to a mental hospital I invited the family at the time of transfer to bring him in to see me when he was discharged. Several such patients came up at regular intervals or at such times as they felt the menace of their problems once again.

Miss K. Y., aged 26, is an example. She was admitted in an acutely dissociated state, quite inaccessible to psychological treatment, and later had to be forcibly fed; for a time even her life was in danger. She recovered in the mental hospital within a few months and was discharged home. During a long period of regular attendance as an out-patient she learned to develop those sides of herself the immaturity of which had been responsible for her breakdown. Her work in a factory was the same mechanical job she had done for over ten years. This was far too meagre an outlet for a person of her capacity and she had necessarily to look elsewhere for intellectual and emotional satisfaction. By belonging to evening classes and joining in the social activity growing out of these she gradually developed a personal environment with which she could interact. Her dreams and phantasies were analysed with her as much as seemed advisable and it is evident that she gradually became a stable, integrated person.

It is obvious that it is advantageous to lay the foundation for such prophylactic after-care as early as possible. As I have already indicated, every effort must be made to establish a good relationship with the patient and his family while he is still in the observation ward, so that he will be willing to come back later if necessary.

One reason for keeping in touch with these patients myself was that the provision for after-care in London was then inadequate. Furthermore, I believe that a patient does better when he continues to work with the psychologist who made the initial contact with him and who already knows him and his home and work environment. Another reason why it seems advisable for such patients to continue to work with the officer attached to the observation ward rather than be referred to an independent psychological clinic is that these clinics often have long waiting-lists and the patient may have to wait for months before he can obtain the help he needs.

HOW FAR IS PSYCHOTHERAPY WORTH WHILE?

Mental hospitals are usually unable to treat the patient psychologically owing to the enormous numbers of patients in proportion to medical officers. Psychiatrists in mental hospitals realise only too well that they have many patients who would benefit by intensive psychotherapy, but for which there is usually no time available.

Whether it is financially profitable to the State to give to individual patients the many hours necessary for psychotherapy is sometimes questioned. In my opinion the point at which economy should be practised is in the initial selection of cases. This selection requires much care. One must take into consideration the patient's past history evaluated in relation to his environment; the actual load, often much greater than the apparent load, under which he has broken down; his intelligence; and what for want of a better term I call "moral fibre." Intuition based on knowledge gained from previous experience also plays its part.

Although the number suited for deep therapy is small, my experience indicates that these individuals are often highly valuable psychologically and are well worth the time and effort expended in helping them to develop sufficient maturity so that they themselves can deal satisfactorily with their life's problems.

I am indebted to Sir Frederick Menzies, county medical officer of health for London, for permission to publish this

paper. My warmest thanks are due to the psychiatric social workers without whose help the work would not have been possible. The psychotherapeutic methods used were those of the Zürich (or Jungian) school of analytical psychology.

AMERICAN MEDICINE

THE OPINIONS OF PRACTITIONERS

THE provision of medical care in the United States is a subject on which much has been written during the past five years, and it might seem that it had now been worn threadbare. But this is not so. "On all great subjects," wrote J. S. Mill, "much remains to be said"; and the truth of this saying is illustrated in two large volumes lately issued by the American Foundation.[1]

The book records the results of an inquiry made by the special technique that the Foundation has used in previous inquiries. The procedure is to present to "the competent groups" a general indication of the problems under consideration, and then "to define the problems comprehensively by assembling all the factors brought forward in the free discussion that follows." In this instance the competent group was the medical profession; and the two volumes consist almost entirely of extracts from some 5000 letters received from about 2100 doctors, selected to represent all branches of practice and all parts of the country. The doctors first selected had all been in practice for at least twenty years, and to each a letter of inquiry to the following effect was sent:—

> Has your experience led you to believe that a radical reorganisation of medical care in this country is indicated? If so, in what direction? If you do not believe that radical reorganisation is indicated, what, if any, changes or revisions in the present system would you like to see made? What evolutionary possibilities would you stress?

A similar letter was sent to a number of doctors—selected with the coöperation of the deans of 67 medical schools—who had been qualified within the past five years, and another to a small group of doctors who had practised for less than twenty but more than five years. Though the replies are anonymous, the names and professional positions of the contributors are given in an appendix. The laborious task of examining, classifying, and setting out the replies has been performed with remarkable skill by Miss Esther E. Lape, and the result is a book that is unique. In thousands of quotations from doctors' letters, many of which are written with a vigour and piquancy of phrase that cannot fail to rouse even the most jaded reader, these two large volumes present, it is claimed, a picture of the whole structure of American medicine—including, as one doctor puts it, "the back of the house as well as the front."

Though the replies show wide divergencies of opinion on most subjects, on some there is a large measure of agreement. It is generally agreed that for many people medical care is not available because of its high cost. But though it costs more it gives more. One contributor points out that while it is true that a man pays more for medical care than his grandfather did,

> "grandfather paid the doctor one dollar per call for feeling the pulse and looking at the tongue and leaving a little calomel; and that type of service was worth one dollar and no more."

The increased cost is attributed chiefly to increased specialism, the use of laboratory procedures, and, what is much more important, increased hospitalisation. A professor of medicine in a middle western university writes:—

> "My income is much larger than that of the average man, and I don't have to pay doctors' bills, but last year, when my boy was in hospitals for several months with a bad streptococcic infection and had to have a series of operations, the bills for hospital care and nursing alone were large enough to send me digging deeply into my savings."

The point upon which the replies most nearly approach unanimity is that the responsibility for providing medical care for the indigent should be assumed by the public authorities as a charge upon public funds. At present such treatment as the indigent receive in America is given chiefly as private charity by the practitioners concerned, and the practical effect of this is generally felt in the profession to be an inequitable thrusting of public responsibilities upon private individuals. On the question of providing medical care for persons who, though not indigent, are unable to make sufficient provision for their own resources there are wide differences of opinion. Some contributors are in favour of a State service of salaried doctors, and the current of opinion towards this view seems to be gaining strength. Others foresee a solution in the adoption of some system of compulsory health insurance, and others in a development of the movement towards voluntary insurance, particularly insurance for hospital care, which has made substantial progress in America during the past few years. Many contributors are, however, against any extension of State provision except for the indigent, and regard compulsory health insurance and a salaried medical service as almost equally objectionable. The provision of free dispensary and hospital treatment, which has been stimulated by the economic depression, is said by some contributors to be much abused by persons well able to pay for medical care. A urologist writes:—

> "I recently plucked a patient from a charity service who paid me a fee of two hundred dollars. He had passed safely through a so-called social service."

An important body of contributors holds that the most urgent problem is not how to make a more equal distribution of the quantity of practitioner and hospital services now existing in the country, but to improve the quality of the services. The feeling of these contributors is "that no system, old or new, will work until there is greater competence." This leads to a discussion of the problems of medical education. Some contributors contend that a medical qualification should be for a limited period and renewed only after a course of post-graduate study. This is urged by a member of the National Board of Medical Examiners, who states that the average doctor

> "ceases to learn when he is licensed to practise. He is not a student, does not take kindly or intelligently to medical advances, and derives most of his inspiration from the pharmaceutical detail men, who make good livings largely from his ignorance."

In a considerable number of replies stress is laid on the need for higher ethical standards of practice. Fee-splitting is said to be widely prevalent. A con-

[1] American Medicine: Expert Testimony out of Court. New York: The American Foundation. 1937. Two vols.; pp. 1435. $3.50. A preliminary note on this book, from a correspondent in the United States, appeared in *The Lancet* of April 10th.

sulting surgeon refers to the (apparently typical) country doctor of his area who

"brings his case to this hospital centre, where he sometimes has previously made arrangements with some surgeon who pays him as high as 60 per cent. of the fee. At other times he parks his case in a hotel and proceeds to sell to the highest bidder, who is sometimes the surgeon with the least practice and least experience. In other words, the patient is put on the auction block."

Many replies deplore the increase of specialism, and particularly the multiplication of the ill-equipped and incompetent "specialist." There are some very frank remarks about unnecessary operations. One pathologist writes:—

"I put in three mornings a week as pathologist to one of our large hospitals, and I have a large collection of appendices, uteri and other organs, which have been removed, if sincerely, then unconsciously, for revenue only."

It is stated that a hospital board recently learnt that "in 28 of 35 appendectomies performed over a comparatively brief period by the chief surgeon, the appendix removed was normal."

The replies of the doctors taking part in this inquiry are, as will be seen from the specimens quoted above, remarkably outspoken; and those who know something of the brilliant achievements of American medicine, and have had the privilege of meeting American doctors in their own country may think that in the replies too much attention has perhaps been paid to "the back of the house" and too little to the front. But the general impression seems to be that it was well worth while to secure a frank and full discussion of so important a subject, even though it may have involved the risk (as a dean of a medical school puts it) "of exposing the family wash to the public gaze, and some loss of prestige on the part of the medical profession." Those who are fortunate enough to read this instructive and entertaining report will probably agree with its editor that: "Whatever part of the family wash is exposed to the public gaze through the medium of this report will, we think, not involve any 'loss of prestige' on the part of the medical profession. The wash on this line, spread along in the pages that follow, will be viewed sympathetically by those interested in developing a coöperative approach to the problem of making more of our citizens able to employ the resources of modern medical science for sickness and for health."

MEDICINE AND THE LAW

Rating of a Hospital

In July, 1935, the Sussex Eye Hospital removed from its old and inadequate quarters in Queen's-road, Brighton, to a new building in Eastern-road. The change meant, as was expected, an increase in the assessment for rates. The governors, however, were by no means prepared for the decision of the rating authority that the assessment should be at £1125 gross and £934 rateable. Negotiations resulted in the figures being reduced to £840 and £697 respectively; but in the opinion of the governors these figures were still too high, and they decided to take the case to quarter sessions by way of appeal. These proceedings took place on July 26th, and the governors lost the day. The appeal was based on three grounds: that as a matter of law the hospital, being a voluntary institution, was not rateable that neither the governors nor any other person had paid rent or could pay it; and that the assessment was excessive and unfair. Evidence for the appellants showed that the capital cost of the building had not yet been raised, that it was impossible to meet this rate demand, and that had the governors been aware of the rateable figure the scheme of removal from the old buildings and the erection of a new hospital might not have been proceeded with. Expert evidence by valuers raised the question of the methods adopted in arriving at the assessment. For the appellants, a valuation per bed was considered the correct way of assessing hospitals; for the respondents, the contractor's theory method was adopted. It was in favour of the latter that the learned recorder, Mr. J. D. Cassels, dismissed the appeal. In his judgment, Mr. Cassels said he held that the hospital must be treated like any other charitable institution—namely, that it was rateable just like any other property that happened to be in occupation. The contention that the hospital was not rateable because no tenant could be found for it, and that therefore there was no beneficial occupation, could not stand. Hospitals did necessarily present very serious difficulties to the rating authorities, but it was a little too much to submit that they were not rateable in general or that this particnlar hospital was not rateable. The recorder added that he had heard with satisfaction that while the hospital must make its contribution towards the expenditure involved in the maintenance of the borough, there was power in the local authority to ease the situation so far as they were concerned, and he had been informed that the rating authority would treat the hospital with generosity, so far as they could do so consistently with their duty to the rest of the ratepayers, and not ask for costs. That was a very correct attitude, and he dismissed the appeal without any order as to costs.

Parent's Refusal to Let Child Wear Glasses

At Portsmouth quarter sessions last week a jury refrained from insisting that a parent should give his child the full advantage of medical resources. William Avery, a clerk, was charged under Section 1 of the Children and Young Persons Act with neglecting his son Peter in a manner likely to cause injury to health. The Act defines such neglect as including failure to provide medical aid or, where the parent has been unable otherwise to provide medical aid, failure to take steps to procure it to be provided under the statutes relating to public assistance. It also defines injury to health as including injury to or loss of sight. The boy had been examined at school by the medical officer who found his sight to be defective. The medical evidence was that the defect of vision could be remedied by spectacles, but apparently the parents refused to make Peter wear glasses. After the school medical examination the usual form was sent to the father with an intimation that, if he could not afford to send the boy to a selected doctor, he could send him to the clinic. This communication, and a subsequent reminder, the father ignored. When charged with neglect, he challenged the system of school examination; he was willing to concede that science had its uses but he declared it was unreasonable to test a child of ten in the same manner as a full-grown adult. The mother, in her evidence, said it was cruel to make the boy wear glasses if he could get along without them. The father not only disputed the necessity for the wearing

of spectacles but defended himself on the higher ground that his personal authority had been interfered with by a set of bureaucrats. The jury agreed with him, and after a short retirement, found a verdict of "not guilty." Experience suggests that, had the case been disposed of by magistrates, the result might have been different.

The prosecution must prove that neglect under Section 1 of the Children and Young Persons Act was wilful. That is to say, it must be deliberate and intentional, not accidental or by mistake; the mind must go with the action. So said Lord Russell of Killowen in R. *v.* Senior in 1899. Where a jury found a verdict of wilful neglect and, after a pause, added the words "through ignorance," the Court of Criminal Appeal decided in R. *v.* Petch that the added words did not negative the finding. In the Hadwen proceedings [1] the court seemed to go so far as to say that, if a man were so prejudiced as to be unwilling to avail himself of the discoveries of medical science, he might be guilty of wilful neglect. The decisive element in prosecutions such as that at Portsmouth last week is the strength of the medical evidence; each case must be decided on its merits. In R. *v.* de Crespigny (1912) justices convicted a father of neglect to provide medical aid inasmuch as he refused to allow his child to be operated on for cleft palate. The High Court refused to interfere; the case was one of fact for the justices. The justices have to give their minds to the nature of the operation and the reasonableness of the refusal. There was an instructive decision in 1914 in Oakey *v.* Jackson. Jackson's 13-year-old child had adenoids and the only possible remedy was a surgical operation. It was not a dangerous operation, though counsel argued that it required an anæsthetic, and that the administration of an anæsthetic must involve some element of danger. The father refused to consent to the operation and the justices held that this did not amount to wilfully neglecting the child in a manner likely to cause injury to health. On appeal Darling, J., said it was not necessary to know much about surgery to know that the operation for the removal of adenoids was very common in the case of children, and that a failure to perform the operation might result in danger to the child's life if the child should happen to be attacked by illness. The High Court sent the case back to the magistrates; it expressed the opinion that they might very properly have convicted Jackson. The parent was under a legal liability to allow the operation if the refusal was in the circumstances a failure to provide adequate medical aid. It was a question of the facts of the particular case. "A refusal to allow an operation is not necessarily such a failure to provide adequate medical aid as to amount to wilful neglect causing injury to health; . . . the justices must take into consideration the nature of the operation and the reasonableness of the parent's refusal to permit it." Mr. Justice Avory added the pithy remark that one matter for consideration by the justices was whether the person who advises the operation is a qualified medical practitioner or merely some irresponsible person. Applying this judgment to the Portsmouth case it is tempting to remark that the equipment of a child with spectacles as a remedy for defective vision is at least as common as the operation for removing adenoids, and that, if Mr. Justice Avory's dictum receives full consideration, the opinion of the medical officer on the question whether the spectacles were necessary for Peter ought to outweigh the opinion of Peter's father.

[1] See *Lancet*, Nov. 8th, 1924, Spec. Suppl., p. 65.

MENTAL HYGIENE

THE SECOND INTERNATIONAL CONGRESS

THE congress was held in Paris at the Maison de la Chimie on July 19th–24th. There was an attendance of over three hundred delegates from forty countries. Sir Laurence Brock, Sir Hubert Bond, Dr. Kate Fraser, and Prof. D. K. Henderson officially represented His Majesty's Government, and Dr. Hugh Crichton-Miller, Dr. Doris Odlum, and Dr. J. R. Rees the National Council for Mental Hygiene.

THE STERILISATION ISSUE.

An important discussion followed the opening papers of Prof. Rüdin of Munich and Dr. H. C. Taylor of New York on eugenics and sterilisation in the prevention of mental illness. Prof. Rüdin believes that the only method of extirpating hereditary mental disorders is by preventing the propagation of tainted sex cells by the humane method of sterilisation and other eliminative eugenic measures. For this purpose he insisted that it was useless to leave the initiative in the hands of the sufferers or their relatives; the decision must be made by others. It should be regarded as a public health service requiring doctors with a strong sense of public duty and thoroughly versed both in the biology of human inheritance and in the art of diagnosis. There must also be intensive propaganda to educate the public in eugenic ideas. The mental specialist had an absolute duty, he insisted, to put the hereditary health of the people first. War, by producing the most extreme counter-selection, was their greatest enemy.

Dr. Taylor reviewed the law and practice in thirty of the United States of America that have at one time or another passed sterilisation laws. He pointed out that the only State in which the experiment had been carried out on a large enough scale to supply scientific evidence about its efficacy was California. He was strongly in favour of the voluntary as opposed to the compulsory principle for two main reasons. In the first place, where the measure lacked public support no one would be sterilised even if compulsory clauses were in force, whereas if public support of sterilisation was forthcoming compulsory clauses would be unnecessary. Secondly, our knowledge of hereditary transmission of mental disorder was still very limited. Moreover, it is probable that even if all the feeble-minded could be sterilised the practical effect would be comparatively slight. Punnit had stated that 10 per cent. of the whole American population were probably carriers of mental defect and that it would require eight thousand years to eliminate these defects by sterilising only those who were actually feeble-minded.

The lively discussion that followed showed a unanimous opposition to the compulsory principle enunciated by Prof. Rüdin. A valuable contribution was made by Sir Laurence Brock, chairman of the Board of Control and also of the departmental committee that recently investigated the case for sterilisation in this country and issued a report wholly in favour of voluntary eugenic sterilisation. He clearly brought out the disadvantages of a compulsory measure, pointing out the danger of producing secrecy and the evasion of an unwelcome law. Such a measure would also, he said, be entirely unjustifiable owing to our imperfect knowledge of heredity and because of the risk of destroying the wheat with the chaff. He admitted that the process of elimination would inevitably be very gradual. Nevertheless he considered that in the evidence that his committee had collected

there was ample justification for passing a measure of voluntary sterilisation for those in whom there was a recognised danger of transmitting hereditary mental disorder or defect.

Prof. Rüdin in replying strongly reaffirmed his belief that compulsory sterilisation was the only practical method of dealing with the problem.

The extensive and varied programme also included discussions on the following:

Mental hygiene and sex, opened by Dr. J M Sacristan (Madrid); mental hygiene in the home, by Dr. Corrado Tumiati (Florence); mental hygiene in the school and university, by Prof. Gonzalo Bosch (Buenos Aires); legislation in relation to the abnormal child, by Prof. G. Vermeylen (Brussels), Miss Evelyn Fox (London) also participating; mental hygiene in relation to intellectual pursuits, by Dr. C. S. Myers (London); mental hygiene and the professions, by Prof. J. M. Lahy (Paris); mental hygiene and the town-dweller, by Prof. Levi-Bianchini (Italy); the rôle of heredity and of the constitutional make-up in the ætiology of mental disorder, by Prof. Ernst Kretschmer (Marburg); the prevention of nervous and mental disorders of toxi-infective origin, by Dr. L. Marchand (Paris); the rôle of social conditions in the ætiology of mental disorder, by Prof. E. Mira (Barcelona); the social and individual prevention of suicide, by Prof. D. K. Henderson (Edinburgh); proposals for an international classification of mental disorders, by Sir Hubert Bond (London); the unification of international psychiatric statistics, by Dr. H. Bersot (Switzerland); research and propaganda in relation to mental hygiene, by Prof. Auguste Wimmer (Copenhagen) and Prof. J. P. Porto Carrero (Rio de Janeiro). Other subjects were the prevention of alcoholism and of drug addiction; the organisation of a centre of preventive mental hygiene; and mental hygiene in relation to crime and the law.

Valuable as the congress proved itself as a medium for the interchange of ideas and for its social contacts, it is to be regretted that the programme was so heavily charged that it was necessary to curtail the time for discussion. It is to be hoped that in future congresses this pitfall will be avoided.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index.

FROM F.R.C.S. (1936)

I

THERE is much to be said for Sunday breakfast done in proper fashion, alone, late, completely oblivious of the imminent lunch and with at least three papers. An uneasy conscience about the medical literature not read during the week leads me, with the toast, to paragraphs of quasi-medical interest. The Dionne children continue in the best of health, a surgeon in Paris bisects a fish and restores it to life, a Hungarian peasant marries and has a child at the age of hundred and thirty-eight. From these it is an easy step to the middle page and "Europe at the Cross Roads." The transition is still easier, and my conscience even lighter, if my eyes have first struck a paragraph or two by or about one of those whom Moynihan calls "medical truants." I have never felt that this cap best fitted those to whom it was applied. The doctor or medical student who abandons medicine, and subsequently as tinker, tailor, soldier, sailor, becomes distinguished, does not absent himself from his work; he changes it. Medical truants suggest to me those doctors who intermittently leave their doctoring for the pursuit of other vocations, and while practising other work remain indelibly the medico. No field is more fecund in examples of both than literature, nor is it possible to let a classification of medical authors rest at only two subdivisions; a third at least can be included. At one end of the scale can be put those whose departures from medicine have been final and complete. Their medical education may have helped them in the attainment of a broader humanity or a deeper cynicism, and their technical knowledge may serve in the construction of an occasional medical plot, but it is primarily as authors that they are and would wish to be considered. Maugham and Smollett are easily remembered examples, and it does not seem to me that either is a truant. In an equally distinct group come the compilers of essays and reflections of the "Consecratio Medici," or the "Æquanimitas" type; and who thinks of Cushing or of Osler as a medical truant? Between these two are the part-time doctor novelists, and writers of the confessions from the consulting-room, for whom truant, with all its associations, would seem a fitting title. Their work in fiction or in reminiscence abounds with hospital anecdote, their characters are largely patients and doctors, and the very smell of the theatre struggles from their pages. Their monopoly of the medical situation in current literature appears almost complete, and it is a rare layman who dares to write on this preserve in other than the most objective terms.

* * *

The public is no longer dependent on the technically uninformed for extracting the last ounce of sentimentality from the sick bed, and this taste for the mawkish is increasingly well served by part-time doctors. There is no evidence that a wide market for professional confidences is going unnurtured, and my Sunday morning seldom passes without the gentle melancholy which follows news of further additions to this field. Even more certain of attention regardless of merit is any work which purports to expose dishonesty in the profession. The crook lawyer and the business shark can attract per se little notice. The charlatan practitioner still commands an immediate and certain publicity, and shares with the renegade priest a wide, uncritical but steady public.

* * *

That euphonious transatlantic importation, the "medical racket," which in the press of its origin appears to cover any transaction involving more than one doctor, is finding a ready adoption in our Sunday press, with the modification that its use carries a definite implication of palm-greasing, of shadiness and dishonesty. Any account of the medical racket can challenge the headlines of "How to be happy though a Film Actor," and I confess it puzzles me. The tearing of the veil that exists between doctor and public in parts of his professional life, with the spectacle of a lapse in one whose work entails a rigid code of professional life, may explain this interest, but I think it battens more on that taste which is largely served by the divorce and police-court news. It is becoming plain that medical rackets are free game for the medical truants, and on the whole their

efforts are more impressive. If a man conceives himself to be the Dickens of his age intimate knowledge of and familiarity with his subject are indispensable. Add honesty, both in belief that a situation exists which needs redress, and in presentation of his material, and such a reformer is bound to command the attention of the profession.

* * *

I have mentioned some examples of doctors who, having severed completely their medical connexion, had established for themselves positions as writers which make it impossible for them to be considered with the parti-coloured galaxy who mix their ink with the pills. Since 1931 A. J. Cronin has established a considerable reputation by novels which, happily combining succés d'estime with large sales, drew no support from privileged peeps at human frailty. This author's position seemed quite clear; he could not be considered with any others than those of the first group.

On Sunday the first account of Dr. Cronin's (or perhaps since 1931 he might prefer to be called Mr.) "The Citadel" affected my blood pressure more than my conviction. After Mr. Straus's urbane appreciations of its literary merits, I lost the subjective sensations of a hypertensive crisis, returned to the first sensational account and reconsidered it. Here, I gathered, is the story of a young provincial graduate, of some academic ability, many ideals, and much ill-defined ambition, who, after practice in Wales and as a medical inspector of mines, starts a quasi-consultant practice in the West End. He is poor and has had no previous experience of medical practice in London. He is without good honorary appointments, and in the absence of first-hand knowledge of Harley-street practitioners, lacks sufficient judgment to avoid the purely meretricious. He comes in contact with dichotomy, he meets doctors who give injections of sterile water, send patients to expensive nursing-homes in which they are financially interested, and perform on them unnecessary and harmful investigations. He succumbs to these practices himself, is unhappy, and walks out of his practice after easing his rebelling conscience in a paroxysm of kettle-blacking. Shorn of its trimmings, such a story may have a basis in fact; it even appeared that redress of such abuses might be accelerated by an airing. But I did suppose that the visitation in the press of the sins of a few on the heads of all Harley-street would be an exaggeration of Mr. Cronin's theme. In the book itself I expected that Mr. Cronin would be at pains to define the minority about whom these grave charges were made. It seemed to me that the hero's approach to the West End had been carefully chosen to show that it was on just such personable young men lacking knowledge of London consultants, and without funds to withstand their offers, that the Jackals—I quote Mr. Cronin—on the borderland of reputable practice, relied for patients. I was mistaken. In subsequent interviews, it appears, Mr. Cronin imputes these practices to a much wider field, although in a generous sentence of one interview the existence of some honest consultants is conceded. By his own account Mr. Cronin has had experience as a medical inspector of mines and of practice in the West End. It is possibly the accident of biography coupled with (if I may adapt the Bishop of Durham on another character) his strong convictions and lofty character which has resulted in this faulty judgment and lack of proper perspective. This is unfortunate in that the charges, having been allowed to assume the fantastic proportions of a nightmare, may receive less of that earnest attention that they deserve. The more so as "The Citadel" is only terminally about Harley-street. It is much more concerned with illustrating deficiencies and inadequacies in general practice and departmental medicine. No distinction is drawn in it between faults dependent on the nature of medical service in this country and those inherent in any human organisation. There are rogues with M.B.'s and accidie is not unknown in doctors. It is not possible to legislate prophylactically against either. The qualifying curriculum may be extended; the G.P. as a unit may be replaced by specialist groups; post-graduate refresher courses may become compulsory. These and other matters are already prominent but the type of public sentiment likely to be agitated by the novel can do little but hinder the reforms at which it aims.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Comdrs. H. Hurst to *President* for course, and J. Kirker to *Victory* for R.N.B., Portsmouth.

Surg. Lt.-Comdrs. H. S. Marks to *Excellent*; S. Jenkinson to *Lucia*; and J. B. Patrick to *President* for course, and to *Furious*.

Surg. Lt. J. W. Oliver to be Surg. Lt.-Comdr.

Surg. Lt. G. L. Hardman to *Weston*.

N. L. Parry, D. C. Howe, and W. G. Smith entered as Surg. Lts. (D) for Short Service and appointed to R.N. Hospital, Haslar, for courses.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lt.-Comdrs. E. E. Henderson to *Caledonia*; and J. B. Hutchinson to *Victory*.

Surg. Sub-Lt. W. H. Osborne to be Surg. Lt.

ROYAL ARMY MEDICAL CORPS

Short Service Commissions: Lt. (on prob.) J. B. Dancer is secd., under the prov. of Art. 213, Royal Warrant for Pay and Promotion, 1931.

INDIAN MEDICAL SERVICE

Lt.-Col. G. T. Burke retires.

Lts. (Temp. Commn.) to be Capts. (Temp. Commn.): M. L. Gujral, B. N. Bhandari, Mohan Singh, S. S. Alam, B. L. Kapur, D. R. Sharma, P. S. Bassalvi, G. N. Ahmadi, P. M. Kaul, A. K. Dev.

Indian Medical Department.—Asst. Surg. (1st Cl.) E. B. Walker to be Lt. (Sen. Asst. Surg.).

DEATHS IN THE SERVICES

Colonel WILSON RANSON, D.S.O., who died on August 1st at Hull, was born in 1870, the son of Joshua Farrar Ranson of Norwich, and was educated at Edinburgh and St. Thomas's Hospital, qualifying in 1894 and becoming F.R.C.S. Edin. in 1898. After serving as assistant surgeon at the County Infirmary, Downpatrick, he joined the R.A.M.C. In 1907 he was in charge of the 15th Regimental District at Beverley. In the European war from 1914–19 he was with the British army of the Rhine and was Col. D.D.M.S. of the 4th Corps, commanding the 3rd Northumberland Field Ambulance, 50th Division, the 47th Casualty Clearing Station, 5th Army, as well as the 30th General Hospital. He was mentioned in dispatches twice, received the D.S.O., and was specially promoted in December, 1917. At the end of the war he became administrative deputy commissioner of medical services at the Ministry of Pensions and medical superintendent of its hospital at Orpington.

Colonel JOSEPH VINCENT MARY BYRNE, director of the Army Dental Services, died at the Queen Alexandra Military Hospital, Millbank, on August 2nd. Born in Dublin in 1884, he qualified as L.D.S. (R.C.S. Irel.) in 1908, and entered the service as a dental surgeon in 1915. In 1921 he was appointed to a permanent commission in the newly formed Army Dental Corps, and spent most of his time in India, reaching the rank of senior officer in 1934 and colonel in the following year. In February, 1936, he was appointed director.

CORRESPONDENCE

PROPHYLACTIC TREATMENT IN OBSTETRICS BY MEANS OF PRONTOSIL AND SULPHANILAMIDE

To the Editor of THE LANCET

SIR,—Great publicity has lately been given in the lay press to the results of treatment with the new drugs of the sulphanilamide group. The letter of Dr. Colebrook in your issue of July 31st deploring the indiscriminate use of potent drugs which are still in the experimental stage is therefore all the more timely.

As, however, Dr. Colebrook refers to a paper which I recently communicated to the North of England Obstetrical and Gynæcological Society, and which was abstracted in your issue of July 10th, I should like to mention in further detail the results obtained. This paper reported the results of the treatment of established puerperal sepsis, and also of an investigation into the prophylaxis of puerperal sepsis with prontosil at Walton Hospital during the past year. In this investigation, alternate cases which had had major obstetrical interference were given prontosil album, and the remainder were used as controls. A dose of nine tablets, each of 0·3 gramme, was given daily for one week, commencing shortly after delivery, or in a few cases immediately before. The only contra-indications to the use of the drug have been the recent treatment of toxæmia of pregnancy with magnesium sulphate, or the presence of cyanosis in cases of heart disease. Up to date 180 cases have been given prontosil, and there have been 203 cases in the control series. The difference in the rate of morbidity by various standards between the two groups is small, but 4 out of the 5 serious cases of sepsis which occurred were in the control series. In no case receiving prontosil has a hæmolytic streptococcus been grown in a lochial culture, though the number of lochial cultures made in this series has been much larger than in the control series. In this latter series, however, hæmolytic streptococci have been cultured in 7 cases, and the only two organisms which have been typed have both been proved to belong to the pathogenic "A" group.

These findings seem to suggest that sulphanilamide has some value in the prevention of infection with a hæmolytic streptococcus in cases that have had interference in labour. As Dr. Colebrook states, there is no evidence that cases that have had interference in labour are any more likely to become infected with a hæmolytic streptococcus than those having had a normal labour. These cases were chosen for investigation, however, because a control series could be more easily obtained, and because for various practical reasons they could be more closely observed. It seems justifiable to assume that the same conclusions, as regards the hæmolytic streptococcus, can be applied to normal deliveries.

Any investigation of this kind can only be made with full bacteriological examination, and with a large series of cases over a prolonged period of time, for infection with a virulent hæmolytic streptococcus must be a relatively uncommon event in any well-conducted institution. It is not suggested from the above findings that there is any justification at present for the routine use of these drugs in either normal or abnormal labour. As you indicate in your annotation on p. 274, it is possible that the risk of toxic effect from these drugs may be greater than the risk of infection with a hæmolytic streptococcus, which, as Dr. Colebrook points out, is a small one. But in the present series, up to date, apart from cyanosis, which has been fairly frequent, though seldom persistent, no serious toxic effects have been noted, and there has been no apparent effect on the babies. At the same time, if it can be found possible to protect patients in labour from infection with a hæmolytic streptococcus, it will be a revolutionary advance in obstetrics. The path of all who practise obstetrics at the present day is a difficult one, as is shown by the results of recent litigation. Up to now, our knowledge of the ætiology of puerperal sepsis due to the hæmolytic streptococcus has been imperfect; but lately, largely owing to the work of Dr. Colebrook and his colleagues, the whole subject has been placed on a sounder foundation, and at last we know the source of the infecting organisms. Though the problem of the hæmolytic streptococcus is by no means the whole problem of puerperal sepsis, it is certainly the most important problem.

We are doubtless only at the beginning of our knowledge of the possibilities of this group of drugs, and perhaps we are on the threshold of realising the dream of Ehrlich, and of being able to treat bacterial diseases as effectively as we can treat many protozoal diseases. The indiscriminate use of these drugs, however, may do more harm than good, and their introduction into obstetrics may only be a tragedy if they are to lead to a neglect of proper technique and to increased interference.

I am, Sir, yours faithfully,

BRYAN WILLIAMS.

Walton Hospital, Liverpool, August 1st.

ECTROPION AND CARDIOVASCULAR DISEASE

To the Editor of THE LANCET

SIR,—During the last four years in general practice I have seen five patients with ectropion of the lower eyelid. Each has also presented a peculiar cardiovascular lesion. The association was discovered fortuitously when the notes of the third patient were entered up in the "disease" card-index.

CASE 1.—An agricultural labourer, aged 59, complained of weakness and a little dyspnœa on exertion. The arteries were soft and there was pulsus alternans. Blood pressure: 170 and 140 mm. Hg systolic; 120 mm. diastolic. Heart enlarged; apex-beat diffuse, apical systolic murmur. Urine: sp. gr. 1020; trace of albumin; no casts; no other microscopical findings. Fundus oculi: no sign of arterio-sclerosis or renal disease. Lids: severe double ectropion, which had begun in the right lower lid five years ago, and in the left four years ago.

CASE 2.—A gardener, aged 71, complained of continuous and severe headache for a year and giddiness for six months. He was not short of breath. Arteries: soft. Blood pressure: 260/140. Urine: sp. gr. 1010; trace of albumin. Fundus; no sign of arterio-sclerosis or renal disease. Lids: severe ectropion in left lower lid; right lid is losing elasticity.

CASE 3.—A carter, aged 70, complained of pain, swelling, and weakness of the legs. His father, who died about 80, is alleged to have had double ectropion. One sister died at 78, and one at 40 of "swelled legs." Two brothers living and healthy, aged 78 and 69. In November, 1933, the patient had a sudden attack of sciatica in his right leg. It lasted for several weeks, and was followed by œdema of both legs, with painful dusky plaques on the right leg. He also developed chronic conjunctivitis in both eyes, and there was slight ectropion. He refused any interference with a mouthful of septic teeth. He has no dyspnœa, no headache, and eats well. Arteries: soft. Blood pressure: 256/124. Triple rhythm of the heart. Urine: sp. gr.

1008; trace of albumin; no casts. Fundus: no sign of arterio-sclerosis or renal disease. Lids: early ectropion of both eyes.

CASE 4.—A thatcher's wife, aged 67, makes no complaint, although she admits to some dyspnœa on exertion. Arteries: soft. Blood pressure: 198/130. Urine: sp. gr. 1018; no albumin; no casts. Fundus: appears normal but is difficult to examine because of opacity of lenses. Lids: early ectropion of right eye.

CASE 5.—A woman, aged 74, has suffered from early ectropion of the right eye for a year. Her general condition is very good; she has no dyspnœa or œdema, and she does a full day's work. Arteries: soft. Blood pressure: 214/112. Urine: trace of albumin.

These five cases have in common: (*a*) ectropion; (*b*) a high diastolic pressure (four of them over 120 mm. Hg); (*c*) a high systolic pressure except in Case 1 where the heart is obviously failing; (*d*) soft arteries; (*e*) no evidence of a renal lesion (the trace of albumin was always very slight); (*f*) an activity and sense of well-being which contrasts strangely with the gravity of the physical signs. None of the patients is confined to his house. Case 1 walks six miles to see me without troubling, and feels fit to start work again; Case 2 spends most of his days walking, and Case 3 stoutly maintains that he feels very well.

This represents my total bag of ectropion, but it would be easy for others to discover whether this association is purely fortuitous, or whether there is in fact a relationship between ectropion and cardio-vascular disease, or possibly even that a syndrome exists in which high diastolic and high pulse pressure are associated with ectropion of the lower lids.

I am, Sir, yours faithfully,

R. E. HOPE SIMPSON.

Beaminster, Dorset, July 24th.

THE REVISED MEDICAL CURRICULUM

To the Editor of THE LANCET

SIR,—The principal issue between Prof. Clark and myself is whether the "resolutions" (brave words) of the General Medical Council have a mandatory or merely optional effect on the medical schools. Of course, the schools can do more both as regards the standard and duration of their teaching than the "resolutions" require, but the crucial question is: Can they do less? Both Prof. Leathes and Prof. Clark seem to think that the Council's "resolutions" are confined to merely offering suggestions to the schools. Prof. Leathes's phrase that their function is to "call attention to the importance" of certain subjects of study seems to confirm this implication.

The public cherishes the notion that the G.M.C. is an imperious autocrat both in its disciplinary and educational authority, and that it has the statutory obligation of *directing* medical education. If the G.M.C. is in fact the feeble advisory body which these two professors picture it to be then the public has been misled and this position is surely dangerous to our profession especially at a time when it is being so widely criticised.

In an article on the G.M.C. which I contributed to the *Nineteenth Century and After* of February, 1926, written with the approval and help of the then president, I stressed the essential impotence of the Council on its disciplinary side, revealed at that date by its inability to restore Dr. Axham to its Register until the College which had originally licensed him had removed its veto. (And I suggested that new legislative powers for it might be desirable.) On its educational side however the G.M.C. possesses the amplest powers, conferred by Parliament. If these have fallen into desuetude through disuse the time would seem ripe for their vigorous assertion.

Perhaps the most mischievous result of the continuous enlargement of the curriculum is, as I pointed out, the increasing restriction of medical study to the relatively well-to-do. This matter is so important that I make no apology for mentioning it again.

The University Grants Committee report for 1935–1936 shows that of a total of 12,923 medical students in England, Scotland, and Wales, 5618 were students of the London schools. The number given for Sheffield University was 202. Expert independent investigation of the financial conditions prevailing in London schools demonstrated that my contention was accurate as regards these schools and therefore I submit, considering the numbers dealt with, may be assumed to be accurate for the residue. Does Prof. Clark really think that his impression to the contrary, supported as it is by no independent evidence, and presumably based on the consideration of the mere fraction of cases at his own institution, can outweigh a conclusion founded on figures constituting nearly half of the whole number of medical students in Great Britain?

I am, Sir, yours faithfully,

E. GRAHAM-LITTLE.

Wimpole-street, W., August 2nd.

ŒSTRIN IN TREATMENT OF CUSHING'S SYNDROME

To the Editor of THE LANCET

SIR,—Dr. Morton Gill's results recorded in your issue of July 10th differ in some respects from those I obtained in a series of similar cases treated with Progynon B (Schering), which I reported to the Association for the Study of Internal Secretions on June 8th, 1937.

My results confirm Dr. Gill's observation on the relief of the severe headaches; moreover a number of the patients were relieved of severe facial neuralgia which had not been benefited by extractions of suspected teeth. Clinically the headaches of the Cushing syndrome are of the type found in hypo-menorrhœic states, the hypo-ovarian syndrome, and at the menopause. Their onset has been found to be concurrent with the abnormal appearance or presence of prolan A in the urine. Further, it has been shown by Albright, Frank, and others that this prolan disappears from the urine when the patient is given sufficient doses of progynon B or progynon D-H—the flushes and headaches disappearing simultaneously. When therapy is discontinued the prolan reappears and the symptoms recur.

In 1935 Nelson noted the similarity of the rat castrate cells (basophil cells of the anterior pituitary) to the basophil cells of the Cushing syndrome as described by Crooke, and because of this he suggested the use of œstrin in the Cushing syndrome. Since 1933 I have been treating cases diagnosed as Cushing syndrome with large doses of progynon benzoate (Schering) and I find that the hypertension is reduced and the general clinical condition improved. My cases, however, have been treated for 1–4 years instead of the short period observed by Dr. Gill. I find that the abnormal systolic pressure is reduced by 20–40 mm. of mercury by the repeated injection of 50,000–100,000 I.U. of progynon B. The first patient treated corresponds to Case 2 of Dr. Gill's series, and she too had failed to maintain the improvement obtained from two courses of X ray therapy

to the pituitary gland. About eight weeks after completing each course the headaches reappeared and the systolic pressure rose. About 12–24 hours after each radiation there was an attack of migraine, and because of the excellent results obtained with progynon B in migraine associated with the hypo-ovarian state she was given 50,000 I.U. of progynon B four hours before each radiation—a measure which resulted in the relief or aborting of the attack. X ray therapy was discontinued when the symptoms recurred, but the patient was given progynon B for her migraine. In six months her general state had much improved, and the migraine attacks, which were not relieved by morphine, were under reasonable control. The systolic pressure of 165 mm. of mercury was reduced to 120; the patient lost her abnormal hair, the reddish striæ disappeared, and her weight fell; the physical and mental picture was completely changed.

Similar results were observed in five cases. As controls a few patients were given interrupted therapy. One was given insufficient dosage of œstrin—as judged by the other cases—and showed increase of plethora, obesity, physical disability, hypertrichosis, striæ, headaches, and facial neuralgia; her systolic pressure rose from 120 mm. of mercury to 155 and the menstrual flow diminished. After 18 months intensive therapy was instituted with complete relief of headaches and control of the systolic pressure. Two patients received enough treatment to demonstrate the relief of the head pains and reduction of systolic pressure. Therapy was then discontinued, and over a year later (August, 1935) both died of pneumonia.

This form of treatment has a definite pattern. Intensive therapy is required at first to relieve the headaches and reduce the abnormal systolic pressure. It will be noted that premenstrually, or at the period when menses should occur, the patient may complain of hot flushes, suffocative attacks, palpitation, anorexia, nausea, headache, depression, or irritability, and it will be found that these symptoms are associated with a rise in the systolic pressure. It is reasonable to presume that the dosage of œstrin used in the earlier weeks of the four-week cycle will be insufficient for the premenstrual period, which is associated with a more active phase of anterior lobe-gonadal activity, as is shown by the premenstrual rise of blood œstrin in normal persons, and in practice one finds that by doubling or tripling the dosage the headache is relieved or aborted and the rising systolic pressure is reduced. It is preferable to give the increased dosage in two portions; for example 100,000 I.U. in the evening and 50,000 I.U. or more in the morning. After this cyclic exacerbation is past the patient is given, weekly or bi-weekly, 50,000 I.U. for the next three weeks—a larger dose may be required in very severe cases—and the dosage is again increased when the fourth week of the cycle returns. This procedure is maintained for months if required but it is usually found that in course of time the dosage can be reduced and the interval between injections increased.

In patients regularly given intensive therapy it is observed that the formerly hypoplastic breasts show parenchymatous hypertrophy, and that a corresponding reaction also takes place in the uterus. At this period the patient has a feeling of well-being and often discontinues therapy of her own accord. Later she comes back because of a return of the headaches and other symptoms and it is found that the breasts and uterus have returned to the former hypoplastic state. It appears that the breasts, especially, store œstrin, and it is this source of œstrin which maintains a symptom-free state when therapy has been discontinued for 8–12 weeks.

From this therapeutic survey the following conclusions have been drawn: (1) the earlier that progynon B therapy is started the more favourable is the prognosis and the chance of preventing secondary non-endocrine changes; (2) the success attained depends directly on the amount and continuity of therapy; (3) the duration of therapy required is related to the duration of the syndrome before œstrin was given. In 5 of my 11 cases (all females; married 9, single 2) pregnancy can be directly correlated to the onset of the syndrome.

Dr. Gill's Case 1, because of the hypertrophied clitoris, belongs clinically to the adrenogenital syndrome, I believe, rather than the Cushing syndrome. The two have a common pathological factor however—namely, hyperplastic (hypertrophy) or adenomatous changes in the adrenal cortex. In such cases as this treated with Progynon B, Proluton (Schering), and Ovarian Concentrate (Armour) we have observed marked reduction of abnormal and normal levels of blood pressure and especially a reduction in the hypertrichosis and a lessening of the coarseness of the hair which remains. Ovarian concentrate was given orally (4–8 capsules a day) to a Jewish girl of 12½ who was obese and hypertrichotic and had a systolic pressure of 155 mm. of mercury. In eighteen months she was of normal weight, had lost much of her excessive hair, and had a normal systolic pressure, besides being more active mentally and physically. Comparing progynon B and proluton in the Cushing syndrome and the adrenogenital syndrome we may say that progynon B relieves the headache and reduces the abnormal systolic pressure, whereas proluton does not relieve the headache but does reduce the systolic blood pressure and maintain it better at the reduced level. Accordingly, during the fourth week of the 28-day cycle, proluton (1 or 2 I.U.) is combined with progynon B and this seems to give better results than progynon B alone. It is my belief that the adrenal cortex and the luteal factor of the ovary are antagonistic in the same manner that œstrin inhibits the anterior lobe. With such a conception we can complete the interrelationship of a triad of glands—the anterior lobe of the pituitary, the adrenal cortex, and the gonads—which are embryologically, physiologically, pathologically, and clinically in intimate relationship.

I have observed no ill effects from high single dosage (450,000 I.U.) or frequent five total dosage (2,000,000 I.U.) and continued weekly dosage (50,000 to 200,000 I.U.) over very long periods of time (1–4 years). On the contrary I have observed nothing but benefit. It should be emphasised, however, that there is a benign and a malignant form of Cushing syndrome and that progynon B therapy is applicable only in the benign form though it can be used for symptomatic relief in the malignant form.

Endocrine therapy, if based on animal experiments, must have equivalent ratios maintained. Dr. Gill quotes Dr. Spence's study of œstrin therapy in hyperthyroid states, which has been criticised in your columns on grounds of failure to maintain the experimental ratio of therapeutic agent to body-weight. It is quite probable that an inadequate supply of progynon B operated both in Dr. Spence's and in Dr. Gill's study, and mention of this possibility must be made in any criticism of their results.

I am, Sir, yours faithfully,

CHARLES W. DUNN.

Philadelphia, Pa., U.S.A., July 21st.

PASTORAL PSYCHOTHERAPY

To the Editor of THE LANCET

SIR,—I know nothing about the Guild of Pastoral Psychotherapy—(in passing, its title suggests pleasantly that we might save our souls in tending sheep)—but Dr. Clifford Allen's letter about it raises some general questions which I cannot help asking.

No doubt we are the people and wisdom shall die with us, but is it necessary to say so quite so loudly and so often as we do? Is it not precisely this habit of claiming a monopoly in season and out which makes us, as a profession, so unpopular with many of our fellow citizens (to our hurt and their's)?

Is there any justification for Dr. Allen's implied assertion that only qualified medical men are fit to minister to sick souls? Would it not be true to say that our training, as it stands, assists us scarcely at all to see into our patients' minds or to help them in their emotional perplexities?

Are not many of the profoundest truths of psychology to be found concisely and vividly stated in the Gospels and may not the study of religion provide as good a foundation for the practice of mind-healing as a study of the physical sciences, medicine, surgery, and midwifery?

Would not the phrase "the viewpoint of the clergy—i.e., right and wrong, sin, and the need for punishment" be exactly paralleled in its unwarrantable assumptions by such a phrase as "the viewpoint of the doctors—i.e., complete psycho-analysis as the only true remedy for neurosis"?

Does not each one of us bristle a little when he is assumed to hold certain views he has never expressed because he belongs to a group called (with a faint tinge of contempt) "The Doctors"?

I am, Sir, yours faithfully,

LINDSEY W. BATTEN.

Lyndhurst-road, N.W., July 30th.

To the Editor of THE LANCET

SIR,—Dr. Clifford Allen has three qualities which, however admirable they may be in other ways, handicap him in his controversy with the Guild of Pastoral Psychotherapy. He is an uncompromising Freudian and therefore does not speak for the majority of British psychotherapists; he displays an anti-religious bias which must make him fundamentally unsympathetic to the Guild's activities; and he has an unfashionable horror of unqualified practice. It is this last characteristic which interests me.

There are two main reasons for the medical profession's objection to unqualified practice. The first, which a Freudian like Dr. Allen must believe to be the dominating one, is that it conflicts with our deepest self-interest. It is, of course, hard that we should have worked seven years to enter what we hoped was a monopolistic business only to find competitors firmly entrenched who knew nothing, let us say, of the relationships of the lesser sac of the peritoneum. It is still more unfortunate for the psychotherapists who practise in a Tom Tiddler's ground where the Christian Scientists, the auto-suggestionists, and the gentlemen who run correspondence courses for the cure of erythrophobia have already staked out claims; a ground, moreover, in which the parent, the pedagogue, the priest, and the philosopher all have legitimate interests. The public does not appreciate the unhappy lot of the psychotherapist. It will go for treatment to the man who gives the best results and the man who does not cure will, in the long run, be driven out of business. In no branch of the healing art are results more easy for the patient to assess ("Whereas I was blind, now I see").

The second objection which the medical profession advances to unqualified practice is that it is against the public interest. It is amusing to see Dr. Allen trying to make the flesh of these unqualified psychotherapists creep with his warnings of cerebral tumours and G.P.I., just as the orthopædic surgeons tried to frighten Sir Herbert Barker with the bogy of tuberculous joints. Sir Herbert was not deterred and I do not suppose the Guild will be. The incidence of G.P.I. in the congregations of the faithful cannot be high.

I doubt if Dr. Allen has fully assimilated the lesson of Sir Herbert Barker's recent demonstration of his manipulative technique to the British Orthopædic Association. It is that the medical profession now objects to unqualified practice only when such practice is bad in itself. Dr. Allen may believe that the practice of the Guild is likely to be bad; he has given no adequate reason for such a belief. I know nothing of the work of the Guild nor which medical psychotherapists are supporting it—but I have recently been steering a patient of mine through an anxiety state who some years ago had a very thorough and prolonged analysis (not at my instance) by a minister of religion with complete cure. The fact that she has come easily through her relapse is entirely due, I believe, to her exceptional knowledge of her own mental background.

I am, Sir, yours faithfully,

Derby, August 2nd. DOUGLAS HUBBLE.

TRUE BLOOD-SUGAR VALUES

To the Editor of THE LANCET

SIR,—The true sugar value of blood, as against the total reducing substances expressed as sugar, is a matter which has exercised many workers. It is generally accepted now that the reduction in the amount of reducing substances, brought about by fermentation with washed yeast, represents the actual glucose content. Three general types of procedure have been used in attempts to approximate or reach this true sugar value by means which do not require the agency of a living organism: (1) special sugar reagents, mostly of the alkaline copper variety, have been developed which are selectively reduced by sugar and not by the non-sugar-reducing substances of the blood; (2) non-sugar-reducing substances have been partially or completely eliminated by precipitation using special protein-precipitating agents; (3) advantage has been taken of the fact that most of the non-sugar-reducing substances are confined to the cells and do not appear in the filtrate made by deproteinising a sample of blood which has been diluted with isotonic sodium sulphate instead of being laked with water.

In attempting completely to eliminate the non-sugar-reducing substances a combination of the second and third methods was proposed in a recent communication from this laboratory (King, Haslewood, and Delory 1937). To this end Somogyi's (1930) zinc hydroxide precipitation was coupled with Herbert and Bourne's (1930) unlaked blood procedure. We have now found that results, lower than the true sugar values, are obtained when the filtrate thus prepared is used with the Harding modification of the Shaffer-Hartman copper reagent.* This is due to a depression of the activity of the copper reagent by small amounts of zinc which are present in the filtrate (cf. also

* We should like to record our thanks to Dr. C. R. Lane who first drew our attention to the discrepancy.

Benedict 1931). We were therefore mistaken in stating that the true sugar value would be obtained with the procedure outlined.

The Harding copper reagent is one of the most sensitive and convenient of the sugar reagents, and it seemed better to discover a filtrate which would give the true sugar value with this reagent than to abandon it for another. Tungstic acid deproteinisation leaves as little as 3 mg. and occasionally as much as 10 mg. per 100 c.cm. of non-sugar-reducing substances (expressed as sugar) when applied to blood diluted with isotonic sodium sulphate; zinc hydroxide, iron, aluminium, and copper hydroxides leave no non-sugar-reducing substance in the filtrate, but all fail in one respect or another to be completely suitable. Copper tungstate precipitation (Somogyi 1931) has seemed to furnish a thoroughly satisfactory method of deproteinisation, which leaves no trace of non-sugar-reducing substance, and introduces nothing in the filtrate which interferes with the activity of the Harding reagent. There is no loss of sugar from solution when copper sulphate and sodium tungstate are added and the copper tungstate is filtered off; thus 9·99 mg. per 100 c.cm. were recovered in the filtrate from a glucose solution of stated strength 10 mg. which by analysis showed 9·92 mg. per 100 c.cm. Sugar added to blood is completely recovered. Sugar added to filtrates from blood which have been rendered sugar-free by fermentation with yeast is satisfactorily recovered. In two representative experiments 102 mg. and 241 mg. were found against 100 mg. and 240 mg. added. Finally, the sugar value determined on the copper tungstate filtrate is very nearly the true sugar value determined by yeast fermentation. Sixty-three mg. fermentable sugar were found for a normal blood and 64 mg. total sugar in the copper tungstate filtrate; a normal blood to which sugar had been added gave 185 mg. fermentable sugar and 187 mg. in the copper tungstate filtrate; and a diabetic blood gave 267 mg. and 267 mg. It would therefore appear that the sugar value determined by the Harding reagent applied to the copper tungstate filtrate approximates very closely to the true fermentable sugar value of blood.

The procedure for preparing the filtrate is as follows: 0·2 c.cm. of capillary blood in 3·2 c.cm. of isotonic (3 per cent.) sodium sulphate is treated with 0·3 c.cm. of 10 per cent. sodium tungstate and 0·3 c.cm. of 7 per cent. copper sulphate ($CuSO_4.5\,H_2O$). The mixture is shaken and centrifuged. Two c.cm. of the clear supernatant are used with 2 c.cm. of the Harding copper reagent for the sugar analysis.

We are, Sir, yours faithfully,

E. J. KING,
G. A. D. HASLEWOOD,
G. DELORY.

British Postgraduate Medical School, London, July 21st.

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THE BIOCHEMICAL CONTROL OF CANCER

To the Editor of THE LANCET

SIR,—In 1934 my biochemical study of the cancer problem (*Protoplasma*, **21**, 73; **22**, 137) was followed by an outline of a preventive and corrective treatment (*J. industr. Hyg.* **16**, 212). The corrective treatment has as its object the restoration of the primary phases of the abnormal metabolism specific to malignant growth, such as oxidation enzymes, including the glutathione equilibrium, vitamin E, B_1, B_2, &c. It consists in (1) the oral administration of baker's yeast in an enzyme-bearing medium, such as unrefined sugar or honey (glycogen equilibrium), and (2) the injection of certain non-toxic sulphur-labile compounds to which sodium tetrathionate, cystine disulphoxide, as well as dichlorodiethyl sulphide (mustard gas), and methylthionine chloride (methylene-blue) belong.

Since then the experimental evidence from various sources has lent definite support to these conclusions. Thus we find from the work of Roffo [11] and Auler [1] on the concentration of cholesterol in the spleen and tumour tissue, and Geschickter and Lewis [6] on the accumulation of sex hormones in connective tissue tumours, that sterols, œstrin, and carcinogenic bodies are linked not only by their constitution and transformation in vitro but actually represent intermediate stages in the ætiology of cancer—in full agreement with my hypothesis. Again, the recent experimental work of several investigators with methylene-blue,[3 10] mustard gas,[12 2] cystine disulphoxide,[8 9] and vitamin E,[4 5] although constituting individually but a phase in my corrective measures, gave encouraging results in increasing the resistance to cancer. The restorative influence of thio-compounds upon the disturbed glutathione equilibrium is well shown by the intravenous and interperitoneal injections of thiosinamine in cases of post-operative glutathione deficiency in the blood, liver, and kidneys.[7]

These available facts definitely point to the potentialities of the complete scheme and warrant its thorough exploration.

I am, Sir, yours faithfully,

MAURICE COPISAROW, D.Sc.

145, Alexandra-road, Manchester, 16, July 21st.

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RESULTS OF CLEANING THE TEETH

To the Editor of THE LANCET

SIR,—In your issue of July 24th Dr. Bol says that mouth hygiene as commonly practised is of no use in preventing caries. Even if it is allowed that it is of some use, he has successfully shown (what experience confirms) that it is far from the perfect weapon it is claimed to be. It is very rare to find a clean mouth, but amongst those who use a toothbrush one is met with indignation if one suggests that the mouth is still dirty. Most patients use, as Dr. Bol says, quite "unnecessary energy," but I would amplify this: this misdirected energy is mainly applied to the upper right teeth and to a less extent to the lower left canine and premolars. The front teeth usually receive a violent brushing in the incisal three-quarters, but since most patients keep the toothbrush outside the mouth instead of wrapping the lips over it while attending to the front teeth the part of the tooth near the gum is sadly neglected. Furthermore, the condition of the toothbrush when

introduced into the mouth is such that the bacterial condition of the mouth is worse after cleaning the teeth than it was before, owing to the circumstances in which the brush is kept. Having been inoculated with bacteria cells and mucus, it is usually hung up, soaking wet, in a warm damp atmosphere.

If it be thought by any that they use the toothbrush sufficiently well to clean their teeth I would suggest that they swab over the teeth with a solution of methylene-blue, or even iodine, and then rinse the mouth. Clean and polished teeth will not accept the stain but mucus plaques receive the dye readily. In fact, when I desire to make the experiment really spectacular, I invite the patients to clean their teeth for as long as they like in my consulting-room with a new toothbrush and whatever cleaning material they fancy and then I apply the methylene-blue. A liberal estimate of those who succeed in cleaning all surfaces of the teeth reasonably well would be 20 per cent. The successful cleaning of the teeth depends, in my opinion, upon a much improved acquaintance with the geography of one's mouth and a careful endeavour to clean it as follows:

1. A careful inspection of the teeth should be made after the application of methylene-blue when a real effort has been made to reach points previously stained, and followed by a suitable correction of the faults in cleaning. When this has been done, the correct method of cleaning that mouth has been found. It may be quite different from the requirements of another case.

2. As many toothbrushes should be kept as times the teeth are cleaned during the twenty-four hours (usually two). Both brushes when new are soaked in an antiseptic solution. One is then taken out, shaken free of the solution, rinsed, and stood up with its handle in the solution to dry, and this brush is used when the teeth are next cleaned. After use it is rinsed under the tap and the bristles put into the solution while the other is shaken free of fluid and stood up to dry. In this way there is always a dry, clean brush for use which is not so likely to introduce a swarm of bacteria into the mouth. A pound jam-jar with a little conical paper cap to keep out the dust answers admirably.

3. A better effect can be obtained if a mucus coagulant is used as a mouthwash just before brushing.

4. The teeth should be cleaned after each meal. If this is impossible almost equally good results can be obtained if they are cleaned *after* breakfast and after the last food taken at night.

The change which takes place in the mouths of patients who have been patientiy shown by means of the stain the places which they fail to clean and who keep their brushes as above described is truly remarkable, and in the case of children with severe caries, who have taken all kinds of calcium-containing material without benefit, the method is an outstanding success. It should be noted that Dr. Bol does not speak of "pyorrhœa" which is unquestionably commoner in the mouths of those who do not use a toothbrush, and I cannot agree with him that a toothbrush correctly used leads to recession of the gums.

Soap-containing dentifrices are open to many objections. It is well known that the addition of antiseptic to soap reduces both the antiseptic power of the soap and of the antiseptic, and when in addition to that, chalk, its natural enemy, is placed into a tube along with the soap it is difficult to see what justification remains.

With all the objections to the toothbrush as at present used—and not the least of these is the fact that no toothbrush as yet offered to the public has bristles anything like fine enough to clean out occlusal fissures—it must remain the most valuable instrument now available to the patient, apart from dental treatment and correct diet, in defence against caries and probably paradontal disease; and if used in conjunction with a spray it will, as I have proved to myself over and over again, keep a mouth in good condition. If the toothbrush is to be condemned because of the results obtained with it generally, it would be as logical to discard iodine because when applied to part of an affected area on a septic swab it fails to leave the whole surface clean and sterile.

I am, Sir, yours faithfully,

CHRISTOPHER DANIELS.

Grosvenor-street, W., July 28th.

PUBLIC HEALTH

L.C.C. Pathological Service Extending

FORTY of the L.C.C. hospitals have laboratories, in 23 of which a whole-time technician is employed. The central pathological service is at the disposal of 65 general and special hospitals, and 9 institutions, containing in all some 38,500 beds. This service consists of 7 group laboratories, a central histological laboratory, and an antitoxin establishment. The work carried out there has increased much in the last two years, in some laboratories it has more than doubled, while the figures for 1937 show a further increase. The present central staff numbers 164, of whom 19 have medical qualifications, and at the last meeting of the L.C.C. leave was obtained to make 23 new appointments. Additional assistant pathologists are to be attached to each of the group laboratories and to the histological laboratory to afford more time for research work, for visiting hospitals and maintaining close coöperation with the clinical side. The need for such large-scale additions is best illustrated by a bare recital of the fact that during 1936 nearly half a million examinations were carried out in the laboratories as a whole.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JULY 24TH, 1937

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 1618; diphtheria, 906; enteric fever, 28; pneumonia (primary or influenzal), 445; puerperal fever, 46; puerperal pyrexia, 118; cerebro-spinal fever, 13; acute poliomyelitis, 18; acute polio-encephalitis, 1; encephalitis lethargica, 7; dysentery, 22; ophthalmia neonatorum, 117. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on July 30th was 2970, which included: Scarlet fever, 774; diphtheria, 767; measles, 176; whooping-cough, 493; puerperal fever, 17 mothers (plus 10 babies); encephalitis lethargica, 282; poliomyelitis, 3. At St. Margaret's Hospital there were 20 babies (plus 13 mothers) with ophthalmia neonatorum.

Deaths.—In 124 great towns, including London, there was no death from small-pox, 1 (0) from enteric fever, 9 (0) from measles, 5 (1) from scarlet fever, 8 (3) from whooping-cough, 30 (2) from diphtheria, 40 (20) from diarrhœa and enteritis under two years, and 6 (0) from influenza. The figures in parentheses are those for London itself.

The only death from enteric fever occurred at Bolton. Sunderland had 3 fatal cases of measles, Nottingham 2. Diphtheria was fatal in 22 great towns; in 4 cases at Manchester, 2 each at Southampton, Birkenhead, Newcastle-upon-Tyne, and Oldham. Liverpool had 4 deaths from diarrhœa, Leeds 3.

The number of stillbirths notified during the week was 276 (corresponding to a rate of 40 per 1000 total births), including 36 in London.

PARIS

(FROM OUR OWN CORRESPONDENT)

DEPOPULATION AND REMEDIES FOR IT

ALL the communications to the Academy of Medicine on June 29th were devoted to the problems of the depopulation of France. In a brief historical survey Dr. A. Couvelaire recalled that in 1813 Napoleon exempted all married Frenchmen from military service, with the result that in a year the nuptiality was doubled and 100,000 more births were registered in 1814 than in the previous year. To evoke 100,000 extra babies from one's country in a year by the mere stroke of a pen is certainly a remarkable achievement whichever the side, credit or debit, on which it is recorded in the balance-sheet of dictatorship. In 1898, in Madagascar, Galliéni put a tax on bachelors and freed from taxation the fathers of five children or more. All fathers of families were exempted from military service, an annual fête in honour of children was instituted, and prizes were given to the mothers of the biggest families. By these measures Galliéni raised the birth-rate in three years from 38 to 51 per 1000 inhabitants. Passing to more recent times, the speaker commented with approval on the measures lately adopted in Germany and Italy where young couples are given a loan whose repayment is rendered increasingly easy as the number of their children rises. With four children, the parents find their loan converted into a gift. The source of this State aid is a tax on bachelors. Although Dr. Couvelaire attached much importance to the psychic factors, what he calls the "climat moral," in the problem, he evidently pinned much if not most of his faith to those administrative measures which he cited from other times and other countries.

A second communication, made by Dr. A. Brindeau, dealt with the obstetrical factor in depopulation. In his opinion sterility in the woman is, in about 50 per cent. of all cases, due to congenital aplasia; and in 100 sterile marriages, 20 to 30 must be traced to the husband. Though he could not give statistical chapter and verse for his opinion that in Paris there are six or seven confinements for every abortion, he seemed to think these figures approximately correct. An encouraging feature is the decline in the infant death-rate at birth. Between 1901 and 1905 it was 45·2 per 1000, whereas in 1934 it was down to 33 per 1000. But during the first ten days of life there are fully as many deaths as at the time of birth. Dr. J. Renault and Mademoiselle G. Labeaume presented on the same occasion a report on the provisions made in France for the protection of children. According to their report, 66,000 of the 1,300,000 children under the age of two years in France enjoy the benefits of the Roussel law enacted for the poorest fraction of the community.

STATE CONTROL OF THE USE OF NEW SERA

One of the last decrees promulgated by Monsieur Henri Sellier while he was still Minister of Public Health concerned experiments with new therapeutic sera. According to the first article of this new decree, any doctor wishing on his own responsibility and for a limited period to undertake systematic investigations of a new product not yet officially accepted must not enter upon therapeutic essays without the express authorisation of the Minister of Public Health. According to the second article, such authorisation is valid only for six months, but can be renewed for another six months after the therapeutic results achieved have been reported on to the Minister of Public Health. According to the third article, the recipient of such authorisation must make no charge for the product in question, and it must be tested only in hospitals and similar institutions officially recognised by the Minister of Public Health on the recommendation of the Serums Commission. According to the fourth article, if the product to be tested comes from abroad, the authorisation must contain a definite statement as to the quantity of this product to be imported into France. It will be seen from these regulations that the Ministry of Public Health is anxious to check the too luxuriant growth of therapeutic activities hinging on new, untried, and possibly dangerous sera.

THE LIMITATIONS OF VOCATIONAL GUIDANCE

The education commission of the Chamber of Deputies recently received in audience a deputation of doctors anxious to give their opinions, as representatives of the medical profession, on scholastic vocational guidance—"orientation professionelle scolaire." The object of this deputation was to put a spoke in the wheel of ultra-fervent performers planning to pass through Parliament a Bill dealing with this still ill-explored subject. It was pointed out by one member of the deputation that in a debate last year at the Hôtel-Dieu in Paris, the lack of a strictly scientific basis to scholastic vocational guidance had been stressed; it was considered a physiological impossibility to forecast the professional aptitudes of a schoolboy of 12 or 13, and representatives of the Syndicat Médical de Paris had gone so far as to maintain that until a lad is out of his teens it is impossible to tell what calling he should seek at 20. The president of the education commission thanked the deputation for the evidence and opinions given. It remains to be seen whether they will prove an effective check on this latest version of casting a horoscope and spotting the winner.

DEATH OF PROF. F. DE LAPERSONNE

Elegant in his kindly, courteous, and academically distinguished way, de Lapersonne will be both mourned and missed by his many friends and pupils in France. He was born in Toulouse in 1853, and it was here that he walked the hospitals and served as an intern. In 1879 he became a Paris intern in the services of Péan and Panas. His attachment to the latter was the beginning of his ophthalmological career. At Lille he was appointed professor of clinical ophthalmology in 1890, and in 1901 he was called back to Paris to fill the chair of ophthalmology at the Hôtel-Dieu just vacated by his former master, Panas. In 1924 he retired from this post, but continued to take an active part in the ophthalmological world. In 1931 he was elected president of the French Academy of Medicine. He was also for several years president of the International Association for the Prevention of Blindness established with the coöperation of the League of Red Cross Societies. The subjects with which de Lapersonne's name will always be associated are ocular syphilis, spinal lymphocytosis, microphthalmia, the prevention of purulent ophthalmia in the new-born, the treatment of trachoma, sporotrichosis, the artificial ripening of cataract, and iridectomy in preparation for cataract operations. He was the recipient of many honours at home and abroad, and among them may be mentioned the Leslie Dana gold medal of U.S.A. origin.

PARLIAMENTARY INTELLIGENCE

BOTH Houses of Parliament adjourned for the summer recess on July 30th. They will reassemble on Oct. 21st unless called together earlier for emergency business.

PASTEURISATION OF MILK

In the House of Commons on July 27th Mr. MACQUISTEN asked leave to introduce a Bill to prohibit the use of the designation "pasteurised" in connexion with the sale of milk, to enforce the use of truly descriptive designations in connexion with the sale of any milk heated above a certain temperature, to amend the Milk and Dairies (Amendment) Act, 1922, and for purposes connected therewith. He said that pasteurised milk was only half-boiled milk cooled down and it would be better for everybody if it was accurately described. Great pressure was being made on the Ministry of Health to make pasteurisation compulsory. The great combines hoped that if that were done all the milk would pass through their hands. If pasteurised or half-boiled milk was such a very good thing let the medical profession urge their patients to half-boil and cool it themselves; let them tell their patients never to use milk unless they had first half-boiled it. Surely it was far better to kill the germs just before use than let the milk go to dairies where it was liable to be infected again after it had been treated.

Mr. LEONARD, opposing the Bill, said that pasteurisation made a higher standard of pre-treatment of milk essential. In a report showing the results of the examination of samples of pasteurised milk in Glasgow it was stated that "milk which fails to reach a certain standard of cleanliness is unsuitable for treatment in pasteurising plants," and even at the present time pasteurisation was raising the standard of milk production. It was not the case that great pressure was being exerted by particular commercial interests in this matter. The greatest pressure in this matter was coming from the health organisations of the country. In the recent outbreak of typhoid in Bournemouth, where there were hundreds of cases and over 50 deaths, all the cases were definitely traced to one milk dealer who sold milk raw. In a report relating to the city of Toronto he found this statement:—

"A study of 300 tuberculous children showed that in the group under 14 years of age 15 per cent. of the extra-pulmonary forms of the disease were due to the bovine form of tubercle bacillus. Without exception the children infected with this type came from districts in Ontario where pasteurisation was not practised. The history invariably revealed the fact that the child had always, or for some time, been fed on raw milk. This finding is confirmed by the fact that not a single case of bovine tuberculous infection has been encountered in the generation of children raised on pasteurised milk in Toronto where pasteurisation has been in force since 1915."

Finally the Government reports showed conclusively that pasteurisation did not destroy the elements in milk that made for health.

Leave to introduce the Bill was refused without a division.

THE COST OF LIVING

On the motion for the second reading of the Consolidated Fund Bill in the House of Commons on July 28th Mr. DAVID GRENFELL raised the question of the cost of living. He said that the Ministry of Labour figures for July, 1937, showed that the average increase of price over the whole list of commodities had been 55 per cent. above the datum level of 100 per cent. for 1914. The Chancellor of the Exchequer had estimated that the increase of wages during the four years 1933–37 was just over £1,000,000 a week, the gross wages paid being somewhere about £2,000,000,000 a year. The recent report of the Unemployment Assistance Board showed that out of a total of 580,000 applicants for unemployment assistance 315,000 were entirely without resources. The number residing alone as lodgers was 107,500 and of these 100,000 were entirely without resources. Comparable figures for those residing in households of two persons were 103,000 and 59,000; in households of three or four, but without children under fourteen, 101,500 and 10,000; or including households with children under fourteen, 268,000 and 146,000. This showed the large mass of people who lived on the verge of poverty. Of these applicants 45 per cent. were over 45 years of age.

It was an undeniable fact that the cost of living was rising rapidly and wages were moving very slowly. The Government took credit for increasing the amount of work available, but the standard of living for the masses of the people was being steadily lowered. All the efforts of the Minister of Health, laudable enough in purpose, for improving health and fitness must fail if proper food, housing, and clothing were not available. If purchasing power was to be allowed to lag behind the inadequate standard of previous years and there was to be no improvement but rather a degradation of the standard of the people, what was the use of talking about improving health and fitness?

Sir ARNOLD WILSON thought that the figures as quoted by Mr. Grenfell did not justify the assumption that the Government should intervene at this stage to bring the cost of living down. He would far rather they did their best through the Food Council and otherwise to prevent a further rise. The present cost of living was about right and there was no large element in it of profiteering.

Mr. OLIVER STANLEY, President of the Board of Trade, said it was not true that the cost of living had risen, if they compared this year with the years that were less abnormal than 1933, 1932, or 1931. The cost of food index was still below that of July, 1930, and considerably below that of 1929. If they were to insure consumers against being suddenly caught by a scarcity of imported goods it was necessary that they should maintain a quantum of production in this country over a period. The Government had attempted to maintain the balance between giving the maximum assistance possible to our producers and causing the minimum of inconvenience and loss to the consumers. Food was the greatest raw material used by our industries, and therefore it was his business to try if he could to see that there were no undue or abnormal rises in its cost. The importance of distribution was also continually under the Government's review. If the health and happiness of this country did depend on commodity and food prices falling as low as possible, then the years 1930–33 ought to have been years of much greater prosperity than was in fact the case. No one would like to go back to that period.

After further debate, Lieut.-Col. COLVILLE, Financial Secretary to the Treasury, said that in considering the method of inquiry into working-class expenditure that was to be undertaken by the Government in the autumn with a view to revising of the basis of the cost of living index the Minister of Labour would have the advantage of a committee representative of various interests, including those of the consumers. Low and falling prices almost invariably accompanied a period of depression and an upward movement one of recovery. The rise in prices over the last four years had been associated with a great increase in working class purchasing power through improvement in employment and wages. This year the Government had to face the immense sum of £862,000,000 as the total estimated national expenditure. Neglect of these financial considerations had in the past in this and other countries tended to endanger those very social services that it must be the strong endeavour of Parliament to preserve.

The Bill was read a second time

CIVILIAN DEFENCE PLANS

On July 27th in the House of Commons Sir ARCHIBALD SINCLAIR opened a debate on the coördination of the Defence Services by moving a reduction in the salary of the Minister. He said civilian defence measures were no less important than the military in strengthening our home front, because it was much more exposed to concentrated air attack than that of any other country. To-day H.M. Government were still trying to pass on to the ratepayers the cost of defending our towns and cities against foreign attack. While this wrangling was going on they were still neglecting their duty to the civilian population. For two years no action had been taken about air-raid precautions, except in anti-gas courses and ambulance services. In this country nothing was being done for bomb-proof shelters, depôts, casualty clearing stations, transport facilities, the protection of telephone exchanges, fire stations, and centres of administration and communication, about which there was a great deal of activity in foreign countries. He asked the Minister for the Coördination of Defence what plans were being made on these lines. Had the Government got plans for improving the exits from London and other cities to facilitate evacuation and for providing transport to the camps and health and sanitary equipment? Was anything being done about the duplication of fire-fighting equipment and water-supplies? Were measures being planned for making tube railways and tunnels, like the Mersey tunnel gas proof? Were plans being made for strengthening our medical and nursing services in times of emergency and, with this in view, would the Government persuade the Home Office not to discourage men and women refugees with medical and nursing qualifications from settling in this country? All these services would require skilled, specially trained, and disciplined men. Were they being recruited, organised, and trained? There was also the vitally important question of food-supply. In the last war we held unchallenged supremacy on the sea, yet we were reduced at one moment to a few weeks' supply of food and there was a real danger of starvation. Now to the submarine was added the air peril. This was a problem which involved agriculture, transport, food storage, and anti-aircraft defence and it could not be satisfactorily solved by a mere branch of one public department like the new Food Plans Department of the Board of Trade. If coördination was needed for the fighting services it was needed no less in the measures of passive defence.

Sir ARTHUR SALTER said he would like to see dispersed inland storage of essential foodstuffs equivalent to a year's consumption of wheat. He said "equivalent" because the whole of the storage need not be in actual wheat itself. The supply could be worked up gradually, starting with six months' and working up until it reached a year's stock. This plan, he claimed, would enable us, if we had a long war, to fight that war for several years undisturbed by the terrible prospect of imminent starvation.

Sir T. INSKIP, Minister for the Coördination of Defence, promised that the questions as to plans for passive air-raid precautions raised by Sir A. Sinclair would be noted and examined. They were all aware of the menace from the air and a great deal of work had been done in connexion with that. The fact that discussions had taken place about the financial responsibility indicated that the Government's plans had reached a very advanced stage. The whole country had been surveyed and divided into certain zones. When the discussions on financial responsibility had ended, and a proper settlement had been arrived at, the plans could be carried into active execution. With regard to food storage, the Government had had the assistance of one of their greatest public servants on this question for months. He had reviewed the position in all the detail necessary to enable the Government to come to a decision. It was not an easy question and the proposals had not been either rejected or accepted at present by the Government. The Government were aware of the advantages. The cost was not a negligible item. There was no opposition from the Services to food storage; indeed they would heartily welcome it. The House might be assured that it would be fully informed of the Government's decision on the matter.

After further debate the motion to reduce the Minister's salary was negatived.

FACTORIES BILL

In the House of Commons on July 27th the Lords amendments to the Factories Bill were considered.

Mr. LLOYD, Under-Secretary, Home Office, moved that the House should agree with the amendment on a new clause extending the period of employment for young persons from 6 P.M. to 7 P.M. providing that the total hours worked did not exceed 44 in any week and that a half-day's holiday, in addition to Saturday, was given. He said that the alteration had been suggested by certain persons interested in education. It was designed to facilitate arrangements being made for a half-day's holiday instead of by cutting down the hours each day in certain cases. The suggestion had been approved by the Board of Education.—Mr. R. J. DAVIES and Viscountess ASTOR expressed great disappointment at the alteration made by the amendment in the Bill. In the subsequent debate it was urged on the Government by Opposition members that there were no grounds—physical, educational, or social—on which the change could be justified.—Captain MARGESSON, Parliamentary Secretary to the Treasury, finally suggested that the Government should be given an opportunity of further considering the matter and a motion that the debate should be adjourned was agreed to.

On the following day, July 28th, the debate was resumed and Mr. LLOYD announced that the Government had carefully considered the proposal and in view of the opinions expressed on the previous night they did not propose to press the amendment. (Cheers.)—The House decided to disagree with the Lords amendment and on further consideration the Lords decided not to press it.—The remaining Lords amendments to the Bill were agreed to.

HEALTH SERVICES IN SCOTLAND

The House of Commons on July 22nd went into Committee of Supply on the Civil Estimates.

On a vote of £2,348,501 to complete the sum necessary for the salaries and expenses of the Department of Health in Scotland,

Mr. ELLIOT, Secretary of State for Scotland, announced a recent valuable agreement with the building industry in Scotland which should have far-reaching effect in housing progress, because it provided machinery for the expansion of personnel and also afforded a ready means of discussing difficulties of organisation which might from time to time hamper progress. It began by recognising the fact that the present problem of housing in Scotland was urgent, and they were trying to stimulate a greater growth of housing activities following the report on rural housing. A circular which had just been issued to all county councils recommended a more adequate inspection of rural houses and special surveys of houses for farm servants and crofters. The Circular also dealt with the demolition of unfit houses, with the improvement of defective houses, a new use of the Housing (Rural Workers) Acts, and the planning, design, and lay-out of new houses. They were taking emergency measures to deal with certain difficulties, and the Commissioner for the Special Areas felt certain of a sufficient degree of support from the local authorities to justify the promotion of a Special Housing Association. In the first half of the year—the worst half—the number of houses actually completed was now 5973. For those yet to be completed in 1937 the estimate—he gave the figures with the utmost reserve—was 11,267. If this was

realised there would be, with those built by private enterprise, a total of some 25,000 houses of five apartments or less—i.e., those wanted to deal with the present situation. That, roughly speaking, was similar to the number completed in the last five years. It was possible that things might get worse before they got better, for they could all see a shortage of labour coming owing to industrial activities, but the whole of his administration was doing its utmost to forward the rehousing of Scotland at an early a date as possible.

Mr. LEONARD said that in the Department's Report there was a reference to home visitation and child welfare schemes in which it was stated that the chief purpose of the visits was to enable the house visitor to advise the mother in matters affecting her own health, individual care, domestic hygiene and home management. There was no reason why they should spend money in doing this when the person who had to manage the home and do the work was not capable of doing it. Therefore he asked what was being done to urge local authorities to prepare for the supply of domestic helps in order to attend working-class homes, especially in view of the fact that the personnel of midwives in the future would be different from what it had been in the past, when they were able to give domestic help in addition to their other technical qualifications. He also asked the Department to pay attention through their inspectors to the question of maternity homes. Under the Maternity Homes Act it was possible for a maternity home to have only one qualified person, who might be the superintendent herself. He was now informed that the total number of maternity homes registered by local authorities in February, 1937, was 146 and the total number of nurses employed in the homes was 747. The number of nurses who neither had the Central Midwives Board qualification, nor were registered in the general part of the register of nurses, were 107. If there was not a proper proportion of qualified nurses he hoped the Department would take the matter up and endeavour to rectify it.

Captain W. T. SHAW said that if the standard of health was to be maintained in Dundee and the small burghs of his constituency something should be done in the near future to restrict the uncontrolled importation of jute from Calcutta which was cutting into the employment of that district.

Mr. MALCOLM MACMILLAN said that no praise was too high for the doctors and nurses of the Highlands and Islands Medical Service. One of their great difficulties was transport, and this had a very definite bearing on the health of the communities in these areas. He described the great difficulties that doctors and nurses had in reaching their destination and there were cases where patients had had to be carried from the far end of Harris, sometimes across hills, down to the roads, if they could be so called, leading to Stornoway in order to reach the only hospitals that had proper equipment and accommodation. The question of roads could not be over-emphasised. Another development which would greatly assist the medical services would be the extension and improvement of the telephone services in the Islands. Another question that was fundamental to sanitation was that of the water-supply, for there were rural areas that could not raise sufficient money locally to pay for a proper supply.

THE UNDER-SECRETARY'S REPLY

After further debate, Mr. WEDDERBURN said that if they compared the present rate of slum clearance with that for any year previous to 1933, it was exceedingly satisfactory, but if they compared it with the needs of their country it was not at all satisfactory, because it was not sufficient to remove slums, let alone overcrowding, within a reasonable period of time. When they began their slum clearance campaign in 1933 it was hoped that both in England and in Scotland slums would all be removed in five years. Since then they had removed 43,000 slums in Scotland, a rate five or six times as high than anything ever done before. The Department of Health had estimated that there were probably still another 50,000 houses yet to be removed, and they were now half-way through 1937. He was speaking of slums alone, apart from overcrowding. They certainly would not remove them by the end of 1938, and whether they would remove them in another five years after that depended on the additional provisions for increasing the supply of labour which they were able to make now. Everybody concerned in the production of houses should reflect that while the present delays continued thousands of people in Scotland had to go on living in conditions of the most hideous squalor from which they could not escape. He was confident that if those engaged in the building trade, the local authorities, and the Department of Health bore that in mind they would be able to raise the rate of production to the height necessary to fulfil the needs of the country.

A motion to reduce the vote was negatived.

NOTES ON CURRENT TOPICS

Health of Post Office Workers

The Consolidated Fund (Appropriation) Bill was read a third time and passed in the House of Commons on July 29th. Major TRYON, Postmaster-General, said his department were giving special attention to better welfare accommodation and such things as staff refreshment rooms for Post Office employees. In 1936 the rate of sickness among men in Post Office employment was the lowest since 1914 and the sickness among women was the lowest since 1906. While he agreed as to the importance of reducing overtime there did not seem to be any good foundation for suggesting that overtime had led to sickness in view of the fact that sickness had not been so low for a very long time past.

On July 26th in the House of Commons the Liverpool United Hospital Bill was read the third time and passed. The Lords amendments to the Coal Mines (Employment of Boys) Bill were agreed to.

In the House of Commons on July 27th Mr. GUY presented a petition, signed by a million persons, praying that the qualifying age for contributory pensions for spinsters should be lowered from 65 to 55.

In the House of Commons on July 28th the Lords amendments to the Local Government Superannuation Bill were agreed to. On July 29th the Lords amendments to the Agriculture Bill and the Local Government Superannuation (Scotland) Bill were considered and agreed to.

In the House of Lords on July 30th the Royal assent was given to the Finance Act, the Factories Act, the Local Government Superannuation (Scotland) Act, the Agriculture Act, the Matrimonial Causes Act, the Cinematograph Films Act, the Coal Mines (Employment of Boys) Act, the Local Government Superannuation Act, the Milk (Amendment) Act, the Royal Samaritan Hospital for Women Glasgow Order Confirmation Act, the Ministry of Health Provisional Order Confirmation (South East Essex Joint Hospital District) Act, and the Liverpool United Hospital Act.

QUESTION TIME

MONDAY, JULY 26TH

Remarks by Coroners

Sir ARNOLD WILSON asked the Home Secretary whether, in anticipating legislation to give effect to the recommendations of the Departmental Committee on Coroners, he would consider issuing a circular drawing their attention to the undesirability of prejudicing the rights of third parties in other courts by expressing opinions on the responsibility or otherwise of employers in relation to fatal accidents.—Sir SAMUEL HOARE replied: I thought that coroners generally were familiar with the Committee's

report, and were aware of the Committee's observations. He knew of no reason for making that particular point the subject of a special circular.

Experiments on Animals

Mr. GROVES asked the Home Secretary if any licensees under the Act 39 and 40 Vict., cap. 77, had been reported by the inspector as contravening the terms of their respective licences at any time during 1937; and if so, what was the nature of such irregularities, at which registered places they occurred, and on what dates.—Sir SAMUEL HOARE replied that three irregularities had been reported by the inspectors during 1937. In one case a licensee holding a certificate "B" had performed several experiments in excess of the number authorised; in two others licensees holding certificates "B" had performed operations, in one case removal of the pituitary gland and in the other partial splenectomy, not authorised by their certificates. Each of these had been reviewed, and it was decided that the circumstances were not such as to call for proceedings against those responsible. It would be contrary to the established practice to disclose the registered places where the irregularities took place.

TUESDAY, JULY 27TH

Pasteurised Milk in Scotland

Sir THOMAS MOORE asked the Secretary of State for Scotland whether his attention had been called to the report issued by the milk production department of the West of Scotland Agricultural College with regard to the deleterious effect of pasteurising milk; and what proportion of the milk used in connexion with the milk-in-schools scheme under his department was pasteurised and fresh, respectively—Mr. ELLIOT replied: I have seen the report in question which relates to an experiment into the relative value of raw and pasteurised milk in calf feeding. I should point out that the results of any single experiment have to be taken in conjunction with a great number of other experiments on this subject which have been and are being made. As regards the second part of the question 53 per cent. of the milk used in connexion with the milk-in-schools scheme in Scotland is pasteurised and 47 per cent. untreated. A large proportion of the milk in both categories is tuberculin-tested.

Ex-Service Men and Surgical Boots

Sir DOUGLAS THOMSON asked the Minister of Pensions whether the new contract for the supply of surgical boots to disabled ex-Service men, replacing the contract recently held by an Aberdeen firm, called for boots hand-made throughout as had been hitherto supplied.—Mr. H. RAMSBOTHAM replied: The new contract follows the form in use over the whole Kingdom with the single exception of North Ireland. It provides for "bespoke hand-sewn" boots throughout except that the soles may be machine stitched and the heels attached mechanically.

Meals at Instruction Centres

Mr. GEORGE HALL asked the Minister of Labour whether he had now considered the report of the National Advisory Council for Juvenile Employment for England and Wales on the provision of meals for juveniles in attendance at junior instruction centres; and what steps he proposed to take to give effect to the recommendations of the committee.—Mr. ERNEST BROWN replied: I have decided to adopt these recommendations and propose to take the necessary steps to give legislative effect to them at the earliest opportunity.

Milk Bars

Mr. ROSTRON DUCKWORTH asked the Minister of Agriculture whether investigations were being made to ascertain whether milk bars were patronised mainly by adults or juveniles.—Mr. RAMSBOTHAM replied: The Minister is not aware of any investigations into this matter, but it is understood from the Milk Marketing Board that, in general, milk bars are patronised mainly by adults.

Blind Persons Bill

Mr. GEORGE GRIFFITHS asked the Minister of Health when the Bill to reduce the age limit for the award to blind persons was going to be submitted.—Mr. BERNAYS replied: My right hon. friend regrets that it has not been found possible to introduce this Bill during the present session, but he is hoping to arrange for its introduction early next session.

WEDNESDAY, JULY 28TH

School-children and Road Safety

Mr. LENNOX-BOYD asked the Minister of Transport what steps were being taken to safeguard children who had to cross main roads to reach their schools; and whether he had considered the provision of subways or bridges in these circumstances.—Mr. BURGIN replied: A portable "Stop: Children Crossing" sign has been authorised and by its use many school authorities were implementing the recommendations of the Committees on Road Safety among School-children. The attention of local authorities generally has been drawn to the valuable recommendations made by those committees as to safeguarding children at road crossings and for their instruction in road safety. In a few cases subways or bridges have been provided, or are being provided; and I am glad to have this opportunity of assuring all concerned that I shall continue to give sympathetic consideration to applications from highway authorities for grants towards such works in appropriate cases.

Health of Naval Artificers

Sir ROBERT YOUNG asked the First Lord of the Admiralty whether he was aware that at Seletar base the engine-room artificers were compelled to live under very unhealthy conditions; that the messes were beneath the dock wall, infested by mosquitoes, the ventilation bad, practically no ventilation was allowed in the non-living ships and, as a consequence, the men of the engine-room department had to work below under abnormal conditions, with stale air; and whether, if these conditions were temporarily necessary, he could arrange that hard-lying money be paid while these conditions exist.—Mr. DUFF COOPER replied: I am causing special inquiries to be made into conditions at Seletar and I will inform the hon. Member of the result as soon as possible.

Exchequer Grants for Rural Housing

Sir PERCY HURD asked the Minister of Health how many rural district councils in England and Wales had made application to the Rural Housing Committee for Exchequer grants in respect of new housing accommodation required for the abatement of overcrowding among the agricultural population under the terms of Section 108 of the Housing Act, 1936; and the number and amounts of the grants approved by him under that section up to the end of June, 1937.—Sir KINGSLEY WOOD replied: Applications have been received from 61 rural district councils and up to the 30th June applications from 52 councils, covering 1117 houses had been considered by the Rural Housing Committee. On the recommendation of the Committee I have undertaken to make the following Exchequer contributions, payable annually for 40 years in respect of each house:—

Houses.	Contribution per house.
3	£2 10 0
90	£5 0 0
29	£5 10 0
2	£6 0 0
33	£7 0 0
12	£7 10 0
673	£8 0 0
842	
43	under consideration in the Department.
232	Committee have deferred their final recommendation until tenders have been obtained.
1117	

Birth Registration

Sir ROBERT TASKER asked the Minister of Health if he was aware that the Registrar-General of Births had effected an amendment of an entry of birth under reference 6253 R.37 of his department without statutory declarations from both the mother and the husband; having regard to the fact that false information had necessitated the amendment of column 6 of the entry, why the Registrar-General had accepted the particulars in column 4 without corroborative testimony from the informant; and whether

he would take steps to call for medical and other evidence to ascertain the correctness or otherwise of the particulars given in column 4 of the entry.—Sir KINGSLEY WOOD replied: The Registrar-General has no power to authorise the correction of an error of fact in a birth register except upon statutory declarations by "two credible persons having knowledge of the truth of the case." In the case referred to the entry of the child's paternity cannot be corrected since the fact itself is in dispute between the husband and wife. The mother's statement that the entry of her husband's address was incorrect was, however, supported by declarations by credible persons that the husband did not reside at the address in question; and no declaration by the husband was necessary. The Registrar-General accordingly authorised the correction of this particular, which is not, indeed, in dispute.

Earth Closets in Northumberland and Durham

Mr. DAVID ADAMS asked the Minister of Health whether he was aware that in the Northumberland and Durham mining villages there were large numbers of earth-closets, far below modern standards, in districts where facilities obtained for suitable water carriage system; and whether this matter had his particular attention.—Sir KINGSLEY WOOD replied: Yes, sir. Schemes for the conversion of 25,000 closets in these counties have been entertained by the Commissioner for the Special Areas.

THURSDAY, JULY 29TH

Free Meals in Secondary Schools

Mr. GEORGE GRIFFITHS asked the Parliamentary Secretary to the Board of Education when information on school meals provided in secondary schools would be available and the statutory authorisation for the supply of these meals.—Mr. KENNETH LINDSAY replied: It is hoped that the information will be available by the end of this year or early in January at the latest. The power of authorities for higher education to provide free meals in secondary schools is derived from the power conferred upon them by Section 71 (c) of the Education Act, 1921, to make maintenance allowances to pupils in schools of higher education.

Diphtheria Immunisation

Mr. LEACH asked the Minister of Health whether he could state approximately how many boroughs, county boroughs, and counties had a diphtheria immunisation scheme in operation in England and Wales.—Sir KINGSLEY WOOD replied: I have no complete information on this subject, but I understand that some action with regard to immunisation against diphtheria is taken by the councils of approximately 74 county boroughs, 117 non-county boroughs, 28 metropolitan boroughs, and 5 counties in England and Wales.

National Health Campaign and Mental Hygiene

Sir FRANCIS FREMANTLE asked the Minister of Health if, having regard to the vital importance of mental health to the community and the growing public interest and need of enlightenment in the subject, he would have it included in the health campaign propaganda which was to be carried out in the autumn under the auspices of the Government.

Mr. WHITELEY asked the Minister of Health why, in view of the importance of mental hygiene in the life of the community, this subject was not being included in the forthcoming national health campaign and public attention was not being directed to the question of mental health services.—Sir KINGSLEY WOOD replied: Opportunities will certainly be taken in the course of the campaign to call attention to the importance of mental as well as bodily health.

Tuberculin-tested Milk

Sir EDWARD GRIGG asked the Minister of Agriculture whether he could give the House any information as to the confirmation of the tribunal which inquired into the position of producers of tuberculin-tested milk; when this inquiry began; when its report was submitted to him; whether that report would be published; and whether the producers of tuberculin-tested milk asked to be included in the Milk Marketing Scheme or pressed, on the contrary, for permission to remain outside it.—Mr. MORRISON replied: The Tuberculin Tested Milk Producers' Association lodged certain objections to the amendments of the Milk Marketing Scheme which, with other objections, were considered last autumn at a public inquiry held by Mr. N. L. Macaskie, K.C. At the conclusion of this inquiry Mr. Macaskie, on my invitation, held a further public inquiry into the question whether it was desirable that I should consent to the withdrawal of the exemption of sales of tuberculin-tested milk from the operation of Part VI of the Scheme. This latter inquiry commenced on Dec. 10th, 1936, and Mr. Macaskie submitted his report on March 22nd, 1937. Following the usual practice the report will not be published. As to the last part of the question, the Association asked that the exemption of sales of tuberculin-tested milk should be made a permanent provision of the scheme, and if, contrary to this submission, the exemption was not continued, that special provision should be made to safeguard the position of producers of tuberculin-tested milk.

Advertisements in Postage Stamp Books

Sir ARNOLD WILSON asked the Postmaster-General whether, in view of the recent discussions of the British Medical Association at Belfast and of the recommendations of the Select Committee on Patent Medicines in 1914, he would give further consideration to the expediency of excluding advertisements of aids to hearing from postage-stamp books sold by his department; and what, if any, financial loss would be occasioned thereby.—Sir W. WOMERSLEY, Assistant Postmaster-General, replied: My right hon. friend has referred to reports of the recent discussions of the British Medical Association on this matter and can find in them no reason for modifying the present policy of the Post Office, which was confirmed a few months ago after careful consideration in connexion with the questions asked on the 7th December last and on the 2nd February last. The financial loss from the exclusion of advertisements of aids to hearing would be upwards of £3000 a year.

FRIDAY, JULY 30TH

Alleged Attacks on Red Cross Units in Spain

Mr. WILFRID ROBERTS asked the Secretary of State for Foreign Affairs whether, in view of the repeated attacks upon Red Cross units in Spain, he would make it a condition of granting belligerent rights to the insurgents that the Red Cross was in future respected.—Viscount CRANBORNE, Under-Secretary for Foreign Affairs, replied: No such attacks have been brought to my notice. The second part of the question does not, therefore, arise.

Silicosis and Asbestosis

Mr. KELLY asked the Home Secretary the number of cases of men and women reported to the Home Office as suffering from silicosis or asbestosis during 1936 and the first six months of 1937.—Sir SAMUEL HOARE replied: Cases of silicosis and asbestosis are not reportable to the Home Office as and when they occur and I do not receive returns for periods of 6 months; but according to the Annual Return from the Medical Board for 1936 they certified 551 cases in that year and in addition certified 198 deaths to have been caused by one or other of these diseases.

Motorists and Independent Medical Attendance

Sir JOHN MELLOR asked the Home Secretary whether he would take steps to secure that any person detained in custody upon a charge of driving a motor vehicle while under the influence of drink should as soon as the police surgeon was sent for, be informed of his right to request the attendance of a doctor of his own selection.—Sir SAMUEL HOARE replied: It is the practice of the Metropolitan Police to inform any person in custody on the charge in question that it is open to him to have a doctor of his own choice called, on the understanding that he will pay the doctor's fee. I understand that the general practice in other police forces is similar. I do not think that any special instructions are called for, but I should be happy to look into the matter further if there is any reason to think that the procedure I have indicated is not followed.

OBITUARY

ERNEST GEORGE FFRENCH, M.D., F.R.C.S. Edin., M.R.C.P. Lond.

WE briefly recorded last week the career in the R.A.M.C. of Dr. E. G. Ffrench, who died on July 25th in his 64th year. Retiring as he did from the service in 1920, he still found opportunity to become an independent dermatologist of wide reputation.

Ffrench was holding a house appointment at Edinburgh when the South African War broke out, and it was as a civil surgeon attached to the West Riding regiment that he first saw active service. Only after taking part in the action at Rhenoster Kop did he apply for a commission in the R.A.M.C. He was stationed for a time at Aldershot and was then sent to Jamaica to deal with an outbreak of yellow fever in the garrison, following with success the methods of Sternberg in Cuba. The next few years were spent with the Royal Engineers at Chatham, as a surgical specialist to the Scottish Command, and as dermatologist at Madras and in the Deccan. Returning to England he took charge of the Rochester-row Military Hospital at a time when rapid mobilisation made this hospital of pivotal importance. He remained there until 1916 when he was sent to Dublin as dermatologist and took part in organising a hospital in the Irish Command. He also equipped the hostel for war nurses in Vincent-square and during the last year of the war he was attached to various hospitals in France, seeing service at Vimy Ridge, Bethune, and Arras, and making contact with the American troops.

[*Photograph by Elliott & Fry*
COLONEL E. G. FFRENCH

Many circumstances combined to give Ffrench an unrivalled experience with the then new remedies for syphilis. At Madras in 1910 he was able to get a supply of salvarsan from Ehrlich's laboratory before it was placed on the market. He saw neosalvarsan tried with success by Prof. John Fordyce at the City Hospital in New York, and experimented with it and its various substitutes, being probably the first to use novarsenobillon when it was made by Poulenc Frères. Kharsivan and neokharsivan when introduced were found to give rise to severe reactions, and it was Ffrench whose experience enabled him to state that they might safely be used with proper precautions. Working at Rochester-row with C. H. Mills on cases which were proving intractable to combined treatment with salvarsan and mercury, he had striking results with the French remedy hectine, a soluble benzosulpho derivative of aminophenyl, containing 21 per cent. of arsenic. When commanding a general hospital in France he saw a good deal of exfoliative dermatitis occurring during arsenical treatment and found the most effective remedy in the intramuscular injection of intramine which was then being used in treating toxic jaundice. The soft chancres and phagedenic ulcers so common at that time healed rapidly, in Ffrench's experience, under the rays of an arc between metallic electrodes. All this stood him in good stead when he collaborated with C. F. Marshall in the production of a text-book of syphilis and venereal diseases which gave practical teaching to practitioners in dealing with all stages of these diseases and their complications. Ffrench was always averse from the routine treatment of syphilis, insisting on the need to study the personal and especially the temperamental factor.

After retirement from the service in July, 1920, Colonel Ffrench settled in practice in Harley-street, and in the following year was appointed chief assistant dermatologist to St. Bartholomew's Hospital, combining that with charge of the skin department at the National Temperance Hospital. He continued to write and investigate; for some time he worked in Vienna, and he was invited to contribute to an American urological review his views on modern progress in the treatment of venereal disease. He had worked both at the Rockefeller Institute and at the Johns Hopkins Hospital, and recently was elected an associate professor of the New York Postgraduate School.

It was on his first visit to the U.S.A. in 1904 that he met the famous handwriting expert, D. N. Carvalho, and married his daughter Adele, who survives him with a son and a daughter.

JAMES OWENS, F.R.C.S.I.

Mr. Owens, surgeon to Mercer's Hospital, Dublin, died after a very short illness on July 26th, in his 38th year. Born at Baltinglass, Co. Wicklow, he was educated at Knockbeg College, Carlow, and at the schools of surgery of the Royal College of Surgeons in Ireland, of which college he became a fellow at a very early age. After qualification he entered general practice in England for a short time, but within a couple of years he was offered the appointment of assistant surgeon to his old hospital, Mercer's Hospital, Dublin. His early promise as a student was more than fulfilled, and when only a few years later an unexpected vacancy on the full staff arose by the death of the late Mr. R. C. B. Maunsell, the promotion of Owens was a certainty. He proved himself a surgeon of unusual ability and judgment, a keen student and a close clinical observer, whose care of his patients did not end when they left his operating-table. As a teacher he was very effective, both when in his earlier days he engaged in private teaching, and later when as a clinical teacher his classes, in the ward and in his out-patient department, were crowded by students from all the Dublin hospitals. He speedily gained the confidence of his associates, and at an unusually early age he found himself with a large surgical practice. His patients and his brethren alike recognised his competence and his trustworthiness. He wrote little, but his contributions to the Royal Academy of Medicine gave evidence of his sound, critical thought, and of his frankness.

"The death of James Owens," writes a colleague, "has come so suddenly and unexpectedly that it is impossible as yet to marshal one's thoughts or to attempt to estimate the loss to Irish surgery and to his hospital that his death entails. His ability as such has been widely recognised and few men so

young have so impressed a large circle. Those who once sought his aid as a consultant and operator sought it again and again, and came to rely more and more on his judgment as well as on his technical skill. He loved his work and he loved the technique of it, but this love never led him to perform an operation of the necessity of which he was not thoroughly convinced. I have known few surgeons—and no other young surgeon—of so sound clinical judgment. His hospital colleagues came to rely on him more and more as they knew him better. He was much more than a 'brilliant operator.' His care before operation and his after-care were as careful as his operative technique. He took a personal interest in his patients which made him not only trusted but beloved, and by his students he was held in equal esteem."

MARTIN HERBERT OLDERSHAW, M.D. Lond., F.R.C.S. Eng.

Mr. Martin Oldershaw, who died on August 2nd, was born in London in 1891, the son of H. A. Oldershaw. He was a delicate boy and his youth was spent by the sea. But he attended the Brighton Grammar School and entered University College, where he took the Bucknill scholarship in 1913. Qualifying M.B., B.S. Lond. in 1917 he went on to take the gold medal at the M.D. in 1919 and the F.R.C.S. Eng. in the same year. At University College Hospital he filled a series of resident appointments, ending with that of Holiday surgical registrar and casualty surgeon, and after further experience at the Lewisham hospital he was elected to the staff of the Hospital for Women, Soho-square, and limited his interest to gynæcological work. Amongst other appointments he was consultant to the L.C.C. and to the St. Pancras Borough Council in obstetrics and gynæcology; latterly he had accepted advisory posts at the British Red Cross Society's clinic and the St. John's clinic at Pimlico. He was a diligent attender of meetings where gynæcological practice was discussed, and made useful contributions himself on such things as the significance of bleeding and the choice of treatment in cancer of the uterus. For some years he was the diligent secretary of the Hunterian Society.

A colleague writes:

"The tragic death of Mr. Martin Oldershaw at the early age of 46 severs a close friendship of over 23 years. He was a valued member of the staff of the Soho Hospital, and worked untiringly for its welfare. He was an able diagnostician, his opinion being constantly sought in difficult cases. About his operating there was nothing spectacular, but invariably the task on hand was done with care and precision. In committee work he was indefatigable, and I cannot remember him not attending if it was humanly possible. Outside his gynæcological work his activities were numerous and varied. As an examiner upon public bodies he was popular and many hundreds of examinees at the Central Midwives Board and the General Nursing Council will remember his kind and considerate manner. He was a keen freemason, and his work for the Hunterian Society will be recalled. In private life he had an attractive personality; he was one who could always be relied on. His chief hobby was fishing, and he was never happier than when he was discussing the good times he had with the rod. Essentially he was a family man, and the deepest sympathy will go out to his widow and a son of 7."

MEDICAL NEWS

University of Cambridge

On July 30th the following degrees were conferred:

M.D.—*J. D. Procter and W. B. A. Lewis.

M.B., B.Chir.—*E. M. Evans, *Patrick Kidd, *C. R. Morison, *G. O. Richardson, *G. M. Fleming, *C. D. Anderson, *H. A. Brook, *T. P. H. McKelvey, *E. F. Aubert, *I. A. Guest, *P. F. Barwood, *J. O. Collin, *W. H. Ekin, *M. T. Parker, and *E. A. Pask; J. F. H. Bulman, R. C. B. Barbor, F. S. Cosh, E. B. French, Harry Haigh, J. P. Reidy, W. B. Waterfall, R. C. S. Dick, C. J. S. Sergel, R. W. Watts, J. P. Singer, C. T. A. Burgess, J. N. Fell, J. C. Gilson, E. A. G. Goldie, C. E. D. H. Goodhart, J. N. Horne, R. W. Markham, J. H. Moir, A. K. Pardhy, K. M. M. Sheldon, H. R. Wynne, I. G. Braddon, A. C. Cunliffe, W. G. Murray-Browne, R. C. Neville, Michael Feiwel, C. M. Dickins, T. P. Myles, C. G. Scorer, P. H. Willcox, R. F. Ashwin, Richmond Edwards, and N. F. Coghill.

* By proxy.

The E. G. Fearnsides scholarship has been awarded to Dr. A. M. Barry of Pembroke College.

University of London

At recent examinations the following candidates were successful:—

M.D.

Branch I (Medicine).—E. G. H. Cowen, Constance E. Field, G. W. Hayward, A. G. Hounslow, and *Archibald Nelson-Jones.

Branch II. (Pathology).—J. L. Hamilton-Paterson and *H. A. Magnus.

Branch IV. (Midwifery and Diseases of Women).—V. H. J. Davies, Rees Evans, *John Howkins, and S. P. Mason.

* University medal.

FINAL EXAMINATION FOR THE DEGREE OF B.D.S.

Group II.—Frank McCombie.

A Memorial to Miss E. M. Pennefather

To commemorate the social service work done in Kensington by the late Miss E. M. Pennefather, it is intended to found a cot which will be named after her in the Princess Louise Hospital for Children, Kensington. Miss Pennefather was chairman of the house committee and a member of the board of management of the hospital from its beginning until her death.

Scottish Conjoint Board

At recent examinations of the Royal Colleges of Physicians and Surgeons of Edinburgh, and the Royal Faculty of Physicians and Surgeons of Glasgow, the following candidates were successful:—

F. E. Adams, Erwin Adler, G. R. Altmann, John Anderson, Max Berg, Dietrich Blos, L. A. P. Cantin, Walter Carsten, J. P. Chapin, K. C. Chee, L. G. Cruickshank, Arthur Dzialoszynski, Herman Felsen, Paul Fleischmann, Ernst Friedmann, A. M. Gall, D. L. Goldman, D. L. C. Greig, I. M. Greenberger, Adolf Hirsch, Paula Heimann, W. I. S. Hudleston, F. P. Hudson, A. T. H. A. Kader, A. M. Kallen, Alfaretta F. Keith, J. J. Kristal, R. R. Levine, H. G. Liebmann, K. M. Little, Benno Lipschitz, E. W. Lou-Hing, D. M. Macdonald, J. M. Mervis, Cecily C. Mitchell, J. R. Moffat, M. J. Munro, M. K. Naidu, Beryl A. Peters, Ernst Rachwalsky, H. L. Riner, W. A. Rock, R. W. Ross, Murray Rubin, Louis Schaffer, I. H. L. Shlefstein, Solomon Siegel, Charlotte B. Sommer, Betty Spier, F. B. Stephenson, W. H. Suffield, W. S. Thomson, S. P. Vosnides, and Edward Weltman.

Research Fellowships in Tropical Medicine

The Medical Research Council have awarded the following research fellowships in tropical medicine, which are tenable for three years:—

Senior Fellowship.—Frank Hawking, D.M. Oxon., D.T.M. Liverp., assistant lecturer in pharmacology, Welsh National School of Medicine, Cardiff.

Junior Fellowships.—David Alexander Cannon, B.Sc., M.B. Glasg.; John Leslie Dales, M.B. Sheff., assistant pathologist, Royal Hospital, Sheffield; and Ian Wilson MacKichan, M.B Camb., house surgeon, London Hospital.

Dr. Hawking will work in Africa on the chemotherapeutic treatment of sleeping sickness. The junior fellows will spend their first two years in this country studying tropical medicine and the use of research methods.

Queen's University, Belfast

Mr. J. R. Wheeler has been appointed lecturer in ophthalmology, and Mr. C. H. G. Macafee and Mr. H. M'Clure lecturers in midwifery and gynæcology.

Royal College of Physicians of London

A quarterly comitia of the college was held on July 29th with Lord Dawson, the president, in the chair. Dr. S. V. Sewell of Melbourne attended as a distinguished guest. The following were elected officers for the ensuing year :—

Censors : Dr. Gordon Holmes, Sir Maurice Cassidy, Dr. Albert Ramsbottom, and Dr. George Beaumont. Treasurer : Dr. Sidney Phillips. Registrar : Sir Raymond Crawfurd. Harveian Librarian : Dr. Arnold Chaplin. Assistant Registrar : Dr. Charles Newman. Library Committee : Dr. J. J. Conybeare, Dr. Adolphe Abrahams, Dr. Reginald Hilton, and Dr. Newman. Curators of the Museum : Dr. R. A. Hickling, Dr. D. T. Davies, Dr. W. Russell Brain, and Dr. E. C. Warner. Finance Committee : Prof. F. S. Langmead, Dr. J. P. Hedley, and Dr. Anthony Feiling.

The following were elected examiners :—

Chemistry : Mr. J. E. Facer and Mr. W. B. Tuck. Physics : Mr. J. H. Brinkworth and Mr. Gilbert Stead. Materia Medica and Pharmacology : Dr. Philip Hamill, Prof. E. J. Wayne, Dr. Clifford Hoyle, Dr. J. W. de W. Gray Thornton, and Prof. W. J. Dilling. Physiology : Prof. C. A. Lovatt Evans, F.R.S., and Prof. B. A. McSwiney. Anatomy : Prof. R. D. Lockhart, Pathology : Dr. Geoffrey Bourne, Dr. F. J. Nattrass, Prof. Geoffrey Hadfield, and Dr. P. N. Panton. Medical Anatomy and Principles and Practice of Medicine : Prof. G. W. Watson, Dr. George Graham, Dr. Feiling, Dr. C. M. Wilson, Dr. G. E. S. Ward, Prof. W. H. Wynn, Prof. F. E. Tylecote, Dr. R. A. Rowlands, Dr. J. A. Drake, Dr. Arnold W. Stott, Dr. Geoffrey Marshall, and Dr. J. Forest Smith. Midwifery and Diseases peculiar to Women : Prof. Gilbert Strachan, Prof. A. Leyland Robinson, Mr. D. W. Roy, Mr. Leslie Williams, and Mr. F. W. Roques. Public Health : Part I, Dr. J. M. Hamill ; Part II, Dr. C. T. Maitland. Tropical Medicine : Prof. J. Gordon Thomson and Lieut.-Colonel G. S. Parkinson. Ophthalmic Medicine and Surgery : Dr. F. M. R. Walshe. Psychological Medicine : Part I, Dr. Henry Yellowlees ; Part II, Dr. Douglas McAlpine and Dr. G. W. B. James. Laryngology and Otology : Mr. V. E. Negus. Radiology : Prof. Sidney Russ and Dr. Russell J. Reynolds. Anæsthetics : Dr. C. W. Morris. Child Health : Prof. Leonard Parsons. Murchison Scholarship (1938) : Dr. Hilton and Dr. K. Shirley Smith.

The Baly gold medal was awarded to Prof. E. L. Kennaway, F.R.S., for his biochemical investigations, which have led to the identification of a group of substances provoking malignant growth of tissues, and having significant relations in structure to certain hormones and vitamins. Sir Edward Mellanby, F.R.S., was appointed Harveian orator for 1938. The Murchison scholarship was awarded by the University of Edinburgh to Dr. James Innes. The following were appointed representatives of the college : Sir Humphry Rolleston on the executive committee of the Imperial Cancer Research Fund ; Dr. Edwin Bramwell on the council of King's College, Newcastle-upon-Tyne ; Lieut.-Colonel Hugh Stott, at the celebration of the 50th anniversary of the foundation of the University of Allahabad on Nov. 16th ; Prof. F. R. Fraser and Colonel A. H. Proctor, at the International Congress for Medical Post-graduate Study in Berlin, from August 21st to 24th ; Dr. W. S. C. Copeman at the centenary of the Royal Medical Society of Budapest, from Oct. 6th to 8th ; and Lord Horder, at the International Cremation Congress, London, from Sept. 24th to Oct. 2nd. Sir Arthur Hurst will deliver the Harveian oration on Oct. 18th at 4 P.M.

The following candidates having satisfied the Censors' Board were admitted to the membership of the college :—

Saul Adler, M.B. Leeds ; N. S. Alcock, M.B. Edin. ; D. S. Bateman, M.B. Oxon. ; William Brander, M.D. Aberd. ; Beatrice A. Butterworth, L.R.C.P. Lond. ; E. M. Buzzard, M.B. Oxon. ; J. V. Cable, M.D. N.Z. ; L. I. M. Castleden, M.D. Lond. ; M. C. Chapman, M.B. Oxon. ; E. M. Darmady, B.Chir. Camb. ; P. C. Dhanda, M.B. Punjab ; David Diamond, L.R.C.P. Lond. ; P. G. Dowling, M.B. Melb. ; Mahmoud Erfan, M.D. Cairo ; Doreen P. Firmin, M.B. Camb. ; W. H. Gabb, M.B. Camb. ; A. R. Gilchrist, M.D. Edin. ; Y. H. Guinena, M.D. Cairo ; Christopher Hardwick, M.B. Camb. ; F. D. Hart, M.B. Edin. ; H. T. Howat, M.B. St. And. ; Martin Hynes, M.B. Camb. ; W. H. Kauntze, M.D. Vict. ; W. A. S. Lamborn, L.R.C.P. Lond. ; L. J. M. Laurent, M.B. Lond. ; David Levine, L.R.C.P. Lond. ; C. A. Lillicrap, M.B. Lond. ; J. F. Loutit, M.B. Oxon. ; Francis McLagan, M.B. St. And. ; W. M. Macleod, M.B. Lond. ; P. T. Madhavi Amma, M.B. Madras ; Archibald Nelson-Jones, M.D. Lond. ; Ananda Nimalasuria, L.R.C.P. Lond. ; B. P. Niyogi, M.B. Calcutta ; J. R. Owen, L.R.C.P. Lond. ; J. F. Paterson, M.B. Camb. ; E. E. Pochin, M.B. Camb. ; J. D. Ramsay, M.B. Glasg. ; W. R. Russell, M.D. Edin. ; J. C. Saldanha, M.B. Lond. ; O. A. Savage, L.R.C.P. Lond. ; J. E. Sewell, M.D. Melb. ; S. C. Shore, L.R.C.P. Lond. ; Thomas Simpson, M.B. Leeds ; A. J. M. Sinclair, M.D. Melb. ; D. W. G. Smith, M.B. Edin. ; W. M. Smithers, M.D. Melb. ; Bezly Thorne Thorne, M.B. Camb. ; G. L. B. Thurston, L.R.C.P. Lond. ; W. R. Trotter, M.B. Oxon. ; J. W. A. Turner, M.B. Oxon. ; R. F. West, M.B. Adelaide ; and Norman Whittaker, L.R.C.P. Lond.

Licences were granted to the following candidates who have passed the final examination of the Conjoint Board :—

B. S. S. Acharya, St. Bart.'s ; Iris A. Acton, King's Coll. ; O. B. Alakija, Guy's ; A. L. Alban, Univ. Coll. ; H. R. Alban, Charing Cross ; M. Albert, Univ. Coll. ; Mary J. Allardice, King's Coll. ; E. L. Allen, St. Bart.'s ; Sheila M. Anderson, Roy. Free ; C. E. Aston, Univ. Coll. ; E. A. Atkinson, Lond. ; J. C. Babbage and F. B. Bagshaw, Manch. ; J. K. Baker, Camb. and Middlesex ; Mary Baker, Roy. Free ; T. E. Barlow, Manch. ; V. N. le P. T. Barlow, St. Thos. ; Mary E. Barnard, Camb. and Manch. ; Alice J. M. T. Barnes, Oxon. and Univ. Coll. ; Laura M. Bates, Roy. Free ; Eileen M. Bateson, Leeds ; G. K. Beatty, St. Thos. ; G. H. H. Benham, Manch. ; B. D. Berger, Lond. ; R. D. D. Birdwood, A. B. Birt, and H. J. Bliss, St. Thos. ; L. B. Blomfield, Guy's ; R. Bloom, Cardiff ; T. K. Bradford, King's Coll. ; Katharine M. H. Branson, Roy. Free ; J. K. Bremer, Cape Town ; H. A. Brook, Camb. and Univ. Coll. ; G. R. H. Brown, Lond. ; D. W. Browne, Middlesex ; J. C. M. Browne, Univ. Coll. ; Marjorie G. Bryan, Cardiff ; C. T. A. Burgess, Camb. and Liverp. ; N. J. Burnand, Guy's ; J. H. Burniston, St. Mary's ; H. S. Bury, King's Coll. ; L. H. Cane, Camb. and St. Bart.'s ; D. W. J. Cohen, King's Coll. ; L. Cohen, Manch. and West Lond. ; A. L. Collins, Westminster ; J. Colover, Univ. Coll ; J. Comyn and Margaret M. J. Conway, King's Coll. ; F. S. Cosh, Camb. and Lond. ; W. W. Cowen, Lond. ; D. I. Crowther, Oxon. and St. Bart.'s ; A. C. Cunliffe, Camb. and St. George's ; A. G. Dabbs, Guy's ; A. David, Cardiff and St. George's ; J. B. David, Liverp. ; T. I. David and L. P. Davies, St. Thos. ; H. J. L. Dickinson, Oxon. and Lond. ; I. Donald, St. Thos. ; P. W. Edmondson, King's Coll. ; G. F. Edwards, Charing Cross ; Phyllis M. Edwards, King's Coll. ; R. W. Ellis and R. E. Emmott, Leeds ; D. T. H. Evans, Liverp. ; E. M. Evans, Camb. and Middlesex ; T. J. Fairbank, Camb. and St. Thos. ; Ivy F. Fallon, Liverp. ; E. L. Fawssett, Middlesex ; W. H. V. D. Ferdinands, Ceylon ; A. R. Ford, St. Bart.'s ; R. G. D. Forward, Camb. and Lond. ; W. B. Foster, St. Bart.'s ; Margaret B. Fox, Roy. Free ; D. L. V. Fraser, Guy's ; Constance M. Frazer, Liverp. ; W. K. S. Friedburg, St. Bart.'s ; E. Gartside, Manch. ; C. H. George, St. Mary's ; Rachel Goldenberg, Roy. Free ; J. Graham, Westminster ; M. P. Graham, Charing Cross ; W. R. Grant, Camb. and St. Bart.'s ; W. P. Greening, Charing Cross ; L. Griffiths, St. Thos. ; T. E. Griffiths, Univ. Coll. ; O. Gunnery, King's Coll. ; H. L. T. J. Hardwick, Charing Cross ; W. Harris, St. Thos. ; R. J. Harrison, St. Bart.'s ; C. C. Harvey, King's Coll. ; S. Hazra, Calcutta and West Lond. ; S. R. T. Headley, St. George's ; R. P. Hendry, Camb. and Liverp. ; L. H. Henein, St. George's ; F. G. Hibbert, Manch. ; H. G. W. Hoare, Camb. and St. George's ; A. Homayoun, St. Bart.'s ; J. H. S. Hopkins, St. Mary's ; W. M. L. Horner, St. Bart.'s ; T. P. Howkins, Birm. ; E. B. C. Hughes, Univ. Coll. ; K. Inamulla, West Lond. ; G. S. Irvine, Univ. Coll. ; R. C. Jackson, Guy's ; I. Jacobson, Cape Town ; S. H. Janikoun, Univ. Coll. ; C. T. Jones, Cardiff ; T. S. Jones, Liverp. ; J. Jordan and G. J. G. King, Camb. and St. Thos. ; G. M. Komrower, Manch. ; M. Krone, Middlesex ; R. E. Lauder, Charing Cross and Roy. So. Hants ; A. D. Le Vay, Univ. Coll. ; C. Levy, Leeds ; Armorel J. Lewis, Cardiff ; A. W. Lipmann-Kessel, St. Mary's ; O. P. Llewellyn, Camb. and Guy's ; W. A. Lombard, Guy's ; G. Lorriman, Durh. ; P. D. Lynch, W'rand and Guy's ; L. McAskie, St. Bart.'s ; D. H. Mackay, Guy's ; K. R. Mackenzie, McGill and St. Bart.'s ; R. R. McSwiney, St. Thos. ; S. A. Maddocks, Middlesex ; E. B. Martin, Lond. ; T. K. Maurice, Camb. and St. Mary's ; B. N. Mazumdar, Middlesex ; P. S. Meyrick, Camb. and Univ. Coll. ; J. R. Miles, Guy's ; A. Miller, Lond. ; C. N. Mills, Guy's ; B. D. Molesworth, Camb. and Lond. ; E. H. Moore, Liverp. ; C. A. Moynihan, Westminster ; Perin K. Mullaferoze, Bombay ; Mary G. Murphy, Univ. Coll. ; R. B. Niven, Oxon. and King's Coll. ; J. H. F. Norbury, St. Thos. ; J. R. Odell, Middlesex ; A. K. Pardhy, Camb. and Birm. ; W. B. Parker, Guy's ; T. Partington, St. George's ; G. R. Peberdy, Durh. ; G. G. Phipps, St. Bart.'s ; T. D. Pilcher, St. Thos. ; J. C. Prestwich, Oxon. and St. Bart.'s ; D. G. Price, Guy's ; G. Quayle, St. George's ; E. P. Quibell, Camb. and St. Bart.'s ; Lilian M. N. Raftery, Roy. Free ; B. K. Rank, Melb. ; H. M. Rapport, Cardiff ; D. C. S. Rendall, St. Bart.'s ; S. R. Reynolds, Camb. and Charing Cross ; W. N. Riley, Leeds ; C. G. Rob, Camb. and St. Thos. ; I. F. Rose, Oxon. and St. Bart.'s ; D. Rubin, Camb. and King's Coll. ; W. R. Russell, Guy's ; C. P. Sames, St. Mary's ; H. S. Samuel, Middlesex ; S. Samuels, Lond. ; P. J. Schultze, Glasg. ; K. B. Scott, St. Bart.'s ; C. E. Shafto, Durh. ; R. Shaw, St. Mary's ; K. M. M. Sheldon, Camb. and Lond. ; J. Skirrow, Leeds and Lond. ; A. F. Smith, Oxon. and Lond. ; I. Smith, Leeds ; R. M. Solomon, Camb. and St. Mary's ; H. Spencer, St. Mary's ; J. H. Sproule, Ceylon ; R. H. Spurrier and C. M. Squire, St. Mary's ; Margaret G. S. Stalker, King's Coll. ; Shelagh M. Streatfeild, Roy. Free ; A. S. Syed, Bombay ; K. G. Symonds, Cardiff ; J. E. Talbot, St. Mary's ; N. G. G. Talbot, King's Coll. ; J. H. Taylor, Lond. ; R. W. Thomason, Birm. ; W. G. Tillmann, C. R. Tilly, and J. A. F. Tobin, Guy's ; Dorothy C. R. Vethavanam, Madras ; D. M. Wallace, Univ. Coll. ; F. Walt, Cape and Guy's ; W. B. Waterfall, Camb. and Lond. ; J. Watkins-Pitchford, St. Thos. ; C. Weston, Oxon. and St. Bart.'s ; A. B. White and G. D. Wild, Manch. ; P. B. S. Willan, Charing Cross ; C. B. I. Willey, Oxon. and Lond. ; G. P. Williams, Westminster ; J. M. G. Wilson, Camb. and Univ. Coll. ; W. Windsor, Lond. ; P. N. Witney, Camb. and St. Thos. ; G. H. Wooler, Camb. and Lond. ; A. W. Woolley, Brist. ; and Ruth F. Wordsworth, West Lond.

The following diplomas were conferred jointly with the Royal College of Surgeons upon the following candidates :—

D.A.—G. E. P. Meldon and H. D. Merrington.

D.O.M.S.—S. M. Ali, T. M. J. Armstrong, H. J. A. Barnard, D. L. Charters, H. R. Cursetji, G. S. Flynn ; P. R. Greeves, A. C. L. Houlton, D. Hugo, M. T. Ismail, H. Jamieson ; J. R.

Kellett, M. A. M. Labib, Josephine M. MacFarlane, T. L. McLarty, V. B. Mankad, I. V. Oza, C. R. Palfreyman, Y. C. Pandit, M. J. Philip, E. V. W. Pockley, P. Ramchander, F. J. Rutter, M. K. Sathe, F. G. Scoles, E. S. Shalom, and C. A. Stanley.

D.T.M. & H.—P. D. Bhargava, A. Caralasingham, S. N. Chelliah, N. Constantoulis, J. De, E. L. W. De Silva, S. B. Dhru, A. A. El Moslimany, Annie Foner, M. V. Hargett, E. H. Hudson, P. W. Hutton, X. Khokhongkha, L. N. Liang, G. D. McLean, E. C. Savona, M. Seraj-ul-Haque, S. B. S. Smith, J. N. Strauss, J. R. de V. Toussaint, and J. White.

D.M.R.—J. A. G. F. Rose and J. E. Swyer.

Diplomas in anæsthetics, public health, laryngology and otology, and psychological medicine were also conferred on the candidates named at the meetings of the Royal College of Surgeons reported in *The Lancet*, June 19th, p. 1497, and July 17th, p. 168.

Royal College of Surgeons of England

An ordinary meeting of the council of the College was held on July 29th with Sir Cuthbert Wallace, the president, in the chair. The Hallett prize was presented to Dr. A. J. Innes. Dr. W. d'A. Maycock and Mr. T. Stewart Heslop were reappointed Leverhulme scholars. Sir Holburt Waring was appointed as the representative of the College on the Newcastle Council of the University of Durham. Permission was given for the annual meeting of the Association of Surgeons to be held in the College on May 5th, 6th, and 7th. The following hospitals were recognised for the six months' surgical practice required of candidates for the final examination for the fellowship:

Derbyshire Royal Infirmary; Miller Hospital, Greenwich; Woolwich War Memorial Hospital; *Grimsby and District Hospital; *Warneford, Leamington, and S. Warwickshire Hospital; *Northampton General Hospital: and *Cornelia and East Dorset Hospital, Poole.

* Temporary recognition until July 31st, 1938.

Diplomas of membership were granted to the candidates named in the report of the Royal College of Physicians as recipients of the L.R.C.P. (except W. B. Foster and A. W. Woolley).

Diplomas in tropical medicine and hygiene, ophthalmic medicine and surgery, medical radiology, and anæsthetics were also conferred jointly with the Royal College of Physicians on the candidates named in its report.

La semaine médicale internationale

The third international medical week organised by the *Schweizerische Medizinische Wochenschrift* will be held from August 29th to Sept. 4th at Interlaken. The subjects to be discussed include problems of general biology, neurology, and carbohydrate metabolism. On Sept. 2nd the members of the course are invited to attend a series of demonstrations arranged by the medical faculty of the University of Berne. Among those who will attend the congress are Prof. Hugh Cairns (London), Prof. H. Spemann (Freiburg im Breisgau), and Prof. O. Loewi (Graz). A detailed programme may be had from the secretary of the meeting, Klosterberg 27, Basel, Switzerland.

Scottish Health Education Campaign

A conference of representatives of Scottish local authorities was held in Edinburgh on July 29th at which Mr. Scrymgeour Wedderburn, parliamentary under-secretary of State, outlined the proposals for a health education campaign in Scotland during the coming autumn and winter. He explained that the Prime Minister was to inaugurate a national campaign at a conference to be held in London on Sept. 30th. The plan of the campaign to be followed in England was to enlist at the outset the public interest in the health services generally and thereafter to concentrate month by month on giving publicity to the various individual services. It was proposed that the campaign in Scotland should take rather a different line and aim not only at urging the fuller use of the existing services but also at encouraging the maximum development of those services within the framework of existing legislation. During the autumn months it was proposed to give full publicity to the Scottish health services. There would then be a preparatory stage during the winter and spring leading up to a further intensive effort in the summer of 1938 associated with the Empire Exhibition in Glasgow.

A petition for the grant of a charter of incorporation to the London (Royal Free Hospital) School of Medicine for Women has been referred to the Privy Council.

Congress of Plastic Surgery

The second European Congress of Structive (Plastic) Surgery will be held at the house of the Royal Society of Medicine, 1, Wimpole-street, London, W., on Oct. 6th and 7th under the presidency of Mr. T. Pomfret Kilner. The subjects for discussion are free skin grafts, nasal contour restoration, and mammaplasty procedures.

Bangor Isolation Hospital

On July 20th a new wing was opened at this hospital. It has cost £3500 and includes six one-bed wards and other rooms.

Donations to London Hospitals

Last year for the first time since the financial crisis subscriptions and donations to London hospitals exceeded £1,000,000. The total was £54,754 higher than in 1935.

Training of Cripples

On July 20th Lord Stanhope, president of the Board of Education, opened the Royal National Orthopædic Hospital's Training College for Cripples at Brockley Hill, Stanmore. There is accommodation for 100 boys who are taught tailoring, boot-making, upholstery, and watch repairing. To complete the work it has been necessary to raise a loan of £25,000. It is hoped in time to extend the work of the centre and also take in crippled girls.

Commonwealth Fund Service Fellowships

The Commonwealth Fund of New York are offering in 1938 not more than five fellowships to men holding appointments overseas under the British Government, the Government of India, or the Government of a British dominion or colony, who wish to undertake research in the United States. Candidates should not be over 35 years of age. Further information may be had from the secretary, Commonwealth Fund Fellowships, 35, Portman-square, London, W.1.

INDEX TO "THE LANCET," VOL. I, 1937

THE Index and Title-page of Vol. I, 1937, which was completed with the issue of June 26th, is now in preparation. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of THE LANCET, 7, Adam-street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

Appointments

BATE, J. G., M.B. Edin., Resident Medical Officer at the country branch hospital of the Hospital for Sick Children, Great Ormond-street.

CADDELL, Lt.-Col. E. D., M.B. Dubl., Secretary-General of the National Association for the Prevention of Tuberculosis.

DONE, JANET M., M.D. Lond., D.P.H. Lond., Assistant Medical Officer of Health and Assistant School Medical Officer (but primarily to carry out the duties of Supervisor of Midwives) for Leicester.

ELKINGTON, J. ST. C., M.D., F.R.C.P. Lond., Assistant Physician to the National Hospital, Queen-square, London.

HEARTH, PAULINE K., M.B. Dubl., D.P.H., Assistant Medical Officer of Health and Assistant School Medical Officer for Leicester.

MCCRACKEN, IAN, M.B. Glasg., D.P.H., Deputy County Medical Officer for the County of London.

MACKAY, JANET H., M.B. Glasg., Assistant Welfare Medical Officer for the County of Durham.

MCPHERSON, C. A., M.B. St. And., L.D.S., Assistant Medical Officer of Health and Assistant School Medical Officer for Leicester.

NEVIN, SAMUEL, M.D. Belf., M.R.C.P. Lond., Assistant Neurologist to King's College Hospital.

O'LEARY, NORAH, M.B. N.U.I., D.P.H., Resident Assistant Medical Officer at the Cleaver Sanatorium for Children, Heswall.

ROGERSON, C. H., M.D., M.R.C.P. Lond., Medical Director of the Cassel Hospital for Functional Nervous Disorders, Penshurst.

WILLIAMSON-NOBLE, F. A., M.B. Camb., F.R.C.S. Eng., Ophthalmic Surgeon to the National Hospital, Queen-square, London.

*WYNESS, W. J. R., M.B. Aberd., Second Resident Assistant Medical Officer at Abergele Sanatorium.

Certifying Surgeons under the Factory and Workshop Acts: Dr. G. C. BROWN (Wool District, Dorset); Dr. H. N. PRITCHETT (Tunbridge Wells District, Kent); Dr. H. D. CHRISTIE (St. Pancras District, London); Dr. J. C. MCGREGOR (Holborn District, London).

* Subject to confirmation.

Vacancies

For further information refer to the advertisement columns

Aberdeen Maternity Hosp.—Sen. R.M.O. and Reg., £200.
Aberdeen, Royal Infirmary.—Surg. Reg., £200.
Adelaide, Institute of Medical Science.—Neale Research Pathologist, £900.
Barnsley, Beckett Hosp. and Dispensary.—Jun. H.S., £200.
Bedford County Hosp.—H.S., at rate of £150.
Birkenhead Education Committee.—Asst. School M.O., £500.
Birmingham Children's Hosp.—Res. Surg. O., £175.
Birmingham City.—Asst. M.O. for Maternity and Child Welfare, £500.
Birmingham, Selly Oak Hosp.—Res. Ear, Nose, and Throat Surgeon. Also Res. Gynæcol. and Obstetrician, each £700.
Bradford City.—Asst. City Pathologist, £500.
Bradford Royal Eye and Ear Hosp.—H.S., £180.
Brighton, New Sussex Hosp. for Women, Windlesham-road.—Hon. Surgeon.
Bristol Royal Infirmary, &c.—Radio-Diagnostician, £500.
Bristol, Southmead Municipal General Hosp.—Jun. Asst. Res. M.O., at rate of £200.
Bristol University, Preventive Medicine Department Laboratories.—Asst. Clin. Path., £400.
Cardiff, King Edward VII Welsh National Memorial Association. Asst. Res. M.O. for South Wales Sanatorium, £200.
Carlisle City.—Asst. M.O. for Maternity and Child Welfare, £600.
Carlisle, Cumberland Infirmary.—Two H.S.'s, each at rate of £160.
Central London Ophthalmic Hosp., Judd-street, W.C.—Asst. Surgeon. Pathologist, £105. Also Sen. and Jun. H.S.'s, at rate of £120 and £100 respectively.
Chester City Hosp.—Jun. Res. M.O., £200.
Chichester, West Sussex County Mental Hospital.—Third. Asst. M.O., £350.
City of London Maternity Hosp., City-road, E.C.—Registrar, £25.
Coventry, City Isolation Hospital.—Res. M.O., £600.
Doncaster Royal Infirmary.—Cas H.S., at rate of £175.
Dumfries, Crichton Royal.—H.P., £200.
East Ham Memorial Hosp., Shrewsbury-road, E.—H.P., at rate of £150.
Erith U.D.C.—Asst. M.O.H. and Asst. School M.O., £500.
French Hosp. and Dispensary, 172, Shaftesbury-avenue, W.C.—Sen. and Jun. R.M.O., £120 and £100 respectively.
Glasgow University.—Lecturer in Pathological Biochemistry, £700.
Gravesend and North Kent Hosp.—Jun. H.S. and Cas. H.S., £120 and £130 respectively.
Hertford County Hosp.—H.P., at rate of £150.
Hertfordshire C.C.—H.S. for County Institution, £175.
Huddersfield Royal Infirmary.—H.P., at rate of £150.
Hull Municipal Maternity Home and Infants' Hosp.—Jun. Res. M.O., at rate of £100.
Ipswich, East Suffolk and Ipswich Hospital.—H.S., £144.
Italian Hosp., Queen-square, W.C.—Second Hon. Asst. Anæsthetist.
Keighley and District Victoria Hosp.—Second Res. M.O., at rate of £120.
Kettering and District General Hosp.—H.P., at rate of £150.
King Edward Memorial Hosp., Ealing.—H.S. to Spec. Depts. Also Cas. H.S., each at rate of £150.
Lancashire C.C.—Temp. Asst. Tuber. O., 15 guineas weekly.
Lancashire Mental Hospitals Board.—Two Med. Supts., each £950.
L.C.C.—Two Temporary Divisional M.O.'s, each £800.
Leicester City Mental Hosp., Humberstone.—Deputy Med. Supt., £800. Also Third Asst. Res. M.O., £350.
Liverpool Port Sanitary Authority.—Asst. Port M.O., £700.
Liverpool Royal Children's Hosp., Myrtle-street.—Med. Reg., £150. Also Surg. Reg., at rate of £150.
Liverpool Sanatorium, Delamere Forest, Frodsham.—Sen. Asst. and Jun. Asst. to Med. Supt., £350 and £225 respectively.
Manchester City.—Deputy Med. Supt. for Abergele Sanatorium, £500. Also Second Res. Asst. M.O. for Baguley Sanatorium, £350.
Manchester, Park Hosp., Davyhulme.—Sen. Res. M.O., £350.
Manchester Royal Children's Hosp., Pendlebury.—Asst. M.O. and Res. M.O., each at rate of £150.
Manchester Royal Infirmary.—Asst. M.O. to Massage and Electrical Dept., £100.
Miller General Hosp., Greenwich, S.E.—Anæsthetist, 52 guineas. Cas. O., at rate of £150. Also H.P. and H.S., each at rate of £100.
Mount Vernon Hosp., Northwood.—Asst. H.S., £150.
Northampton County Borough Education Committee.—Asst. School Dentist, £450.
Nottingham Children's Hosp.—Res. H.P., at rate of £150.
Plymouth City General Hosp.—Jun. Asst. M.O., at rate of £250.
Plymouth, Prince of Wales's Hosp.—Hon. Aural Surgeon and Hon. Med. Reg. H.S. Also Res. Anæsthetist and H.S. to Spec. Depts., each at rate of £120.
Portsmouth Royal Hosp.—Fourth H.S., at rate of £130.
Preston and County of Lancaster Royal Infirmary.—Res. Surg. O., £300.
Preston, Wrightington Hosp., Appley Bridge.—Jun. Asst. M.O., £200.
Queen Charlotte's Maternity Hosp., Marylebone-road, N.W.—Registrar, 20 guineas.
Rochdale Infirmary and Dispensary.—H.P. and Second H.S., each at rate of £150.
Romford, Oldchurch Hosp.—Jun. Res. M.O., £250.
***Rotherham Hosp.*—H.S. for Ophth. and Ear, Nose, and Throat Depts., £150.**
Rowley Regis Borough Council.—Deputy M.O.H. and Asst. School M.O., £600.
Royal College of Physicians, Pall Mall East, S.W.—Milroy Lecturer.
Royal Eye Hosp., St. George's-circus, S.E.—Sen. H.S. and Two Asst. H.S.'s, at rate of £150 and £100 respectively.
Ryde, Royal Isle of Wight County Hospital.—Hon. Surgeon to Ear, Nose and Throat Dept. Hon. Pathologist. Also Jun. H.S., £120.
St. Albans, Hill End Hosp. and Clinic.—Locum Tenens M.O., 7 guineas per week.
St. Bartholomew's Hosp., E.C.—Dental H.S., at rate of £80.
St. John's Hosp., Lewisham, S.E.—Med. Reg. to Out-patient Dept., 50 guineas.
St. Leonard's-on-Sea, Buchanan Hosp.—Hon. Neurologist.
***Sheffield Children's Hosp.*—H.S., £100.**
Southampton Children's Hosp. and Dispensary for Women.—Res. M.O., at rate of £150.
Southampton, Royal South Hants and Southampton Hosp.—Cas. O., and Res. Anæsthetist and H.S. to Ear, Nose, and Throat Dept., each at rate of £150.
Southend-on-Sea Infectious Diseases Hosp.—Med. Supt., £750.
Southern Rhodesia Medical Service.—Government M.O., £600.
Staffordshire County Council.—Res. Asst. M.O. for Wordsley Public Assistance Institution, at rate of £300.
Staffordshire General Infirmary.—H.S., at rate of £200. Also H.P. and Cas. O., at rate of £150.
Stoke-on-Trent, Longton Hosp.—H.S., at rate of £180.
Sunderland County Borough.—Asst. School M.O., £600.
Sutton and Cheam Hosp.—Res. M.O., at rate of £100.
Ventnor, Royal National Hosp. for Consumption, &c.—Second Asst. Res. M.O., at rate of £200.
Weir Hosp., Grove-road, Balham, S.W.—Sen. and Jun. Res. M.O.'s, £250 and £150 respectively.
West London Hosp., Hammersmith-road, W.—Res. Anæsthetist, at rate of £100.
***Weston-super-Mare General Hosp.*—Res. H.P., £150.**
Woking and District Victoria Hosp.—Res. M.O., £120.
Worcestershire Mental Hosp., Barnsley Hall.—Second Asst. M.O., £350.

The Chief Inspector of Factories announces a vacancy for a Certifying Factory Surgeon at Northwich (Chester).

Births, Marriages, and Deaths

BIRTHS

BROMLEY.—On July 31st, at Bury St. Edmunds, the wife of Dr. James Wilfred Bromley, of a son.
EVANS.—On July 24th, at Eltham, the wife of Dr. J. D. Evans, of a son.
HAWKSLEY.—On July 25th, at Park-road, N.W., the wife of Dr. J. C. Hawksley, of a son.
RICE.—On July 25th, at Norwich, the wife of Dr. R. A. C. Rice, of a son.
SAMMONS.—On July 28th, at Kingswood, Bristol, the wife of Dr. R. A. Sammons, of a son.
VAILE.—On July 25th, at Chertsey, the wife of Dr. J. D. B. Vaile, of a son.
WHITELAW.—On July 26th, at Boscombe, the wife of Dr. J. C. G. Whitelaw, of a son.

MARRIAGES

CLARK—JOHNSON.—On July 31st, at Staple Church, Canterbury, William Adam Clark, M.B., to Pauline Mary Mylne, only child of the Rev. Cyril Johnson, Canterbury.
STICH—HARMAN.—On July 24th, at St. Lawrence's, Whitchurch, Dr. A. Benham Stich, M.B. Glasg., A.I.C., to Muriel Nancie, only daughter of Mr. F. G. Harman of Canons Park.
WRIGHT—GWYNNE-JONES.—On July 17th, at Villa Candens, Gerrards Cross, William Wright, D.Sc., F.R.C.S., to Gwladys, widow of Dr. W. T. Gwynne-Jones, of Gerrards Cross.

DEATHS

BYRNE.—On August 2nd, at Queen Alexandra's Military Hospital, Millbank, Col. Joseph V. M. Byrne, Director, Army Dental Services.
DAVIS.—On July 28th, Arthur Holdsworth Davis, M.B. Lond., aged 73 years.
HEAD.—On July 21st, at the Tyrell Cottage Hospital, Ilfracombe, Philip Alexander Dewar Head, M.R.C.S. Eng., late of Croyde, Devon, aged 79 years.
OLDERSHAW.—On August 2nd, Martin Herbert Oldershaw, M.D. Lond., F.R.C.S. Eng., of Upper Wimpole-street, W., aged 46.
ORMEROD.—On July 27th, at Merrow, Guildford, Charles Evelyn Ormerod, M.D. Brux., M.R.C.S. Eng.
RANSON.—On August 1st, at Hull, Col. Wilson Ranson, D.S.O., F.R.C.S. Edin., late R.A.M.C.
WADD.—On July 27th, at Richmond Hill, Surrey, Harry Randall Wadd, M.R.C.S. Eng.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

HEALTH OF NORTHERN IRELAND

THE annual report for 1936 of the Registrar-General for Northern Ireland [1] shows that the estimated population of rather more than a million and a quarter experienced a crude death-rate of 14·2 per 1000 inhabitants and a live-birth rate of 20·0. Owing to the relatively high birth-rate the natural rate of increase of the population was just double that recorded in the same year in England and Wales. Neither the death- nor birth-rate differs materially from that registered in the preceding quinquennium. The infant mortality-rate was 77 per 1000 live births, a relatively high figure by modern standards, and has shown no definite tendency to fall over the last twelve years. The experience of the urban districts with a rate of 90 per 1000 is particularly unfavourable, and there is the customary excessive figure for those illegitimately born—162 per 1000 births.

The standardised death-rate of males, 11·5 per 1000, is a little higher than the corresponding rate for England and Wales, 10·4, while the female rate is considerably higher, 10·7 as compared with 8·2. Respiratory tuberculosis fell to the lowest level recorded since Northern Ireland became a separate unit in 1922, but it still accounts for approximately half the deaths occurring at ages 15–25 and nearly 40 per cent. of those at ages 25–35.

Puerperal mortality has shown an upward trend since 1924. The real level of such causes of death as cancer, diabetes, and cerebral hæmorrhage, which fall largely upon the older age-group, is made indeterminate by the large proportion of deaths ascribed to senility. In 1936 one death in ten, in the total, was so described and half the deaths at ages 85 and upwards. Over the last ten years this figure has been declining and also the percentage of deaths uncertified or with ill-defined or unknown causes, so that the statistics are slowly improving.

The Registrar-General sets them out in considerable detail both by place of registration and area of allocation. His figures suggest at least two problems worthy of some study—namely, the relatively high death-rates in infancy and the less favourable experience of females than males when compared with the death-rates of England and Wales.

ANIMALS ABROAD AND AT HOME

IN our attitude towards animals few of us can boast of being consistently rational. Between the field—or, if you will, blood-sport—enthusiast and the humanitarian lies a gulf sometimes more apparent than real. Certainly there is often common ground between them, and when, for example, an attractive species of animal is threatened with extinction, they would be better employed in uniting against their common enemy, the commercial slayer, than in acrimoniously disputing with one another. The latest issue of the Animal Year Book [2] is unfortunately able to give several instances of such threats. D. G. Stead writes on the vast and largely illicit destruction of the common opossum of Australia, and A. H. B. Kirkman gives a sad account of Africa's vanishing fauna. It appears that the very existence of the Bubal hartebeest is now doubtful and that of the Cape species precarious. The mountain zebra is reduced to two herds—less than 50 head all told—and the giant sable antelope is also in danger of extinction. For these tragedies the undiscriminating hunter is no less to blame than the commercial slayer and, if action is not speedily taken, these and many other animals will soon be as extinct as the quagga and blaauwbok.

The Year Book contains notes by various writers on animals abroad which make interesting, if sometimes depressing, reading. In India, for example, the Hindu belief in the sanctity of the cow forbids the killing of cattle, however old or diseased, with the result that, when their time of usefulness is over, they are either officiously kept alive or else allowed to die of starvation. More heartening is the account, by M. D. Austin, of an experiment in the humane education of school-children at present being carried out by the University of London and Deeside animal welfare societies with the coöperation of the director of education for Flintshire which embraces both urban and rural schools. The urban schools have an annual film exhibition and, if it is desired, a talk on some aspect of animal welfare. The rural schools have a talk, illustrated by suitable pictures and photographs. Essay competitions follow the talks and are judged rather on accurate reproduction of the facts than on literary merit. In 1936, 41 schools were visited and 2415 children instructed in this way. C. W. Hume, who explains how and why the humane electrocution of dogs and cats is not yet practicable, attacks cock-fighting which still goes on in the Pas-de-Calais; the same writer has much to say against gin-traps but little to offer as an alternative. I. E. and K. Ramsbottom, however, report favourably on an admittedly limited experience of the use of calcium cyanide for the humane destruction of rabbits. W. M. Levitt discusses the practical possibility of castrating male cattle, sheep and pigs with X rays. R. Glave Saunders's advice to those who would keep monkeys as pets is the same as Mr. Punch's to those about to marry.

The volume includes numerous reviews of books about animals and, in an appendix, the aims and objects of Ulaws, the University of London Animal Welfare Society, are clearly set forth.

SURGICAL EXPERIENCES IN THE SPANISH WAR

THE June number of the Portuguese journal *Clinica, Higiene e Hidrologia* is largely devoted to an account by M. Gomez-Duran of the organisation of a group of advanced hospitals in the Spanish war zone and the work carried on there under his direction. To these hospitals only the most serious cases can be admitted, less severely wounded men being sent straight to the base hospitals. Hence the relatively high proportion of cases (6 per cent. of the admissions) in which no surgical treatment was attempted and in which death occurred within 12 hours. Hence, also, the fact that the cases comprise chiefly penetrating wounds of the great cavities of the body, including the skull, and of the spinal cord and that a large proportion were suffering from the effects of hæmorrhage and shock. In the series here reported, penetrating wounds of the cranium totalled 40, of which 13 proved fatal; of the thorax 39, 4 fatal; of the abdomen 41, 10 fatal; abdomino-thoracic wounds 4, 3 fatal; multiple wounds caused by shrapnel 37, 2 fatal; compound fractures of the limbs 36, 5 fatal; spinal cord lesions 6, 3 fatal; severe wounds of the head and neck 24, 1 fatal; and severe wounds of the limbs 39, 4 fatal. Gomez-Duran describes the routine treatment applied to each group of injuries, and comments briefly on the results. His paper should be of interest to other army surgeons.

WE are asked by Dr. H. V. CRABTREE (Torquay) to announce that he is no longer associated in partnership with the Southern Medical Agency, and that in consequence of his withdrawal all correspondence for that agency should be addressed to 1, Albert-street, Birmingham.

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[1] Government of Northern Ireland. The Registrar-General's Annual Report for 1936, containing general abstracts of births, deaths and marriages registered in Northern Ireland during the year. H.M.S.O. 1937. Pp. 74. 2*s*. 6*d*.

[2] Animal Year Book. Edited by H. E. Borgmann, Ph.D. Vol. 4. Obtainable from Ulaws, 42, Torrington-square, W.C.1. 1937. Pp. 163. 2*s*. 6*d*.